The Newspaper of Informatica Systems Management
August 16, 1993, Vol. 27, No. 33, 114 Pages, $6/Copy, $48/Year

COMPUTERWORLD

Cisco waves white flag, changes SNA strategy

By Elisabeth Horwitt
MENLO PARK, CALIF.

The yearlong battle of the Systems Network Architecture internetworking standards officially ended last week.

Cisco Systems, Inc. renounced its efforts to develop a protocol to compete with IBM's Advanced Peer-to-Peer Networking and is moving forward to equip its routers with IBM's SNA internetworking architecture.

APPN could be the key to open SNA internetworking
See story page 12

The fracas, however, resulted in a clear win for users, observers said. It forced IBM to make APPN a far more open multivendor protocol, said Nancy Vandell, information architect at Chevron Information Technology.

Initially proposed by Cisco about 10 months ago, the Advanced Peer-to-Peer Internetworking protocol was being developed by Cisco and its allies in the APPI Forum. APPI was to provide users with the same intelligent routing and directory functions that APPN provides for SNA devices but on existing Transmission Control Protocol/Internet Protocol backbones.

This would have saved users from having to implement yet another proprietary IBM protocol on their internetworks, Cisco said. However, APPI had trouble gaining user interest and vendor support, particularly from major router vendors other than Cisco and Proteon, Inc. [CW, March 15].

Meanwhile, IBM has taken several steps to make APPN more open, including making patents and licenses for the technology

Cisco, *page 12*

Sybase to unite tool set

Seeks to grab app development back from third parties

By Kim S. Nash
EMERYVILLE, CALIF.

Notoriously weak in the application development arena, Sybase, Inc. plans to disclose Aug. 30 a scheme to house its disparate tools under one roof, sources close to the company said last week. The firm is also expected to unveil an object-oriented tool that has been more than a year in the making.

Building blocks

Sybase's major application development products

	Function	Key data
APT Workbench	4GL for building applications and forms under Unix, VMS and DOS	Added Motif support in June
Dept	Application modeling and analysis tool	Acquired March 1991
Gain-Momentum	Object-oriented tool set for building multimedia programs	Acquired September 1992
Calypso	Object-oriented modeling suite	To be announced

Sybase's unification strategy hinges on building links between tools in an otherwise disconnected set. Until now, third parties such as Uniface Corp. and Powersoft Corp. have filled the gaps Sybase left open — something Sybase encouraged. But gradually dropping database prices combined with a growing tools market enticed Sybase to enter the development arena, analysts said.

"They're leaving money on the table" with every database sale that does not include tools, said Rob Tholemeier, an analyst at Meta Group, Inc. in Burlingame, Calif.

For example, Chevron Canada Ltd. bought Microsoft Corp.'s Visual Basic when it could not get the Windows tools it wanted from Sybase, said Bill Soper, manager of information services at the oil company in Vancouver, British Columbia. "If we can get it all from Sybase, and

Sybase, *page 10*

Whither wireless security?

By James Daly

While the growing use of wireless voice and data transmission technology has mobile executives salivating for its anywhere, anytime communications capabilities, the thought of sensitive data skittering unfettered over the airwaves has made some security managers nervous. They wonder if the benefits are worth the potential for abuse.

"I have to admit that it makes me a little jumpy," said Brian Rediker, director of security and operations at National Securities Clearing Corp. in New York. "It's still too early to tell if an outsider could pick off our data."

The arrival of personal digital assistants such as Apple Computer, Inc.'s Newton MessagePad and EO, Inc.'s Personal Communicator, coupled with skyrocketing sales of cellular phones, packet radio modems, sky pagers and wireless electronic-mail devices, has created new points of vulnerability for electronic data interchange, experts said.

"None of us would ever leave a confidential memo lying on a restaurant table, but then we turn around and don't think twice about transmitting data electronically without a safeguard," said Bob Geisler, a senior consultant at CCT, Inc., a consultancy in Minneapolis.

Wireless, *page 8*

Newspaper
#BYBBJFT********** 5 DIGIT 48103
#UIU7ZE3OOM099039# 0060109715
UNIVERSITY MICROFILMS INT 0904
UNIVERSITY MICROFILMS INT 6 XC
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48103

Groupware applications

Notes leads, but flaws cited

By Michael Vizard
SAN JOSE, CALIF.

■ Lotus Development Corp.'s Notes may be groupware's top dog today, but the company needs to adjust the product's pricing and overcome integration problems for it to remain dominant, observers said at last week's Groupware '93 show.

For Notes to succeed long term, Lotus must adopt a pricing model for the product that is akin to those used by operating systems vendors rather than the PC application model it now uses, analysts said. This will make it less expensive for users to adopt Notes company-wide.

Second, while Notes applications can be integrated across multiple platforms, third-party applications cannot be easily integrated into Notes because there are no common application programming interfaces. This is likely to make Notes' cross-platform architecture a less than compelling issue.

Users and resellers, meanwhile, are pressuring Lotus to deliver a runtime version that will allow applications developed using Notes to be deployed on remote systems inexpensively.

"We have a Notes pilot project that could go to 500 licenses tomorrow. But without a Notes runtime, we'll probably take a year to deploy it. And by that time, who knows what Microsoft will have?" said Carolyn Coughlin Weissberg, Notes engineer at Genencor International in San Francisco.

Lotus is resisting a runtime license option because such licenses would preclude end users from developing their own applications, noted Cliff Conneighton, director of Notes marketing.

Weissberg noted, however, that most companies do not have or want end users capable of developing robust Notes applications.

Groupware headaches. The electrifying growth of groupware applications in business units is creating a whole new set of headaches for IS. Front-line IS managers, such as Max Burgstahler of Illinois Power Co., say political hassles and integrating SQL databases and back-office operations are among the biggest problems. *See story page 85.*

Notes, *page 14*

A PUBLICATION OF IDG

Table of Contents

August 16, 1993

NEWS

■ **Microsoft** slides into a PowerPC alliance through a licensing deal with **Motorola**. *Page 4*

■ An emerging crop of subnotebooks draws good early reviews. *Page 4*

■ The new head of IS at the **Defense Department** pledges support for the DOD's flagging modernization program. *Page 6*

■ **GTE** seeks savings by consolidating outsourcing contracts. The beneficiary is **Systematics Telecommunications Services**. *Page 7*

■ **Borland**, **Microsoft** and now **Symantec** vie for ownership of the C++ development world. *Page 8*

■ **Oracle** changes direction: It will ship Windows-based development tools before releasing Unix versions. *Page 10*

■ **Novell** plans significant expansions of NetWare for SAA. *Page 12*

■ **IBM**, **Novell** and **Microsoft** plan launches of peer networking products, but corporate buyers may be hard to find. *Page 16*

■ **Unisys** consolidates, turning five business units into three. *Page 20*

ADVANCED TECHNOLOGY

■ Computers are learning to draw analogies the way humans do. *Page 28*

DESKTOP COMPUTING

■ The real potential of word processing lies in integration with other applications. *Page 41*

■ The market is ready and waiting for luggable, multimedia portable computers. *Page 44*

WORKGROUP COMPUTING

■ A grocery-sector information service gives users fast, targeted views into a massive store of mainframe-based information and data via Unix workstations. *Page 53*

ALAN LEVENSON

The Phoenix Police Department's Mike Barry *says a computerized records system is helping officers keep ahead of crime.* **Page 81**

ENTERPRISE NETWORKING

■ Efforts are under way to kick the speed of cellular data networks up to the 1G bit/sec. range. *Page 63*

LARGE SYSTEMS

■ New software from IBM allows a mainframe to back up non-IBM workstations and other gear. *Page 71*

■ A chemical company says the best approach to a client/server project is full speed ahead. *Page 71*

APPLICATION DEVELOPMENT

■ A wary market for client/server development tools gives a positive welcome to Powersoft's PowerBuilder 3.0. *Page 81*

MANAGEMENT

■ Integration hassles plague groupware implementors. *Page 85*

IN DEPTH

■ Consumer and computer technology is converging to produce a "communicopia" of interactive TV and multimedia applications. *Page 89*

CAREERS

KEEPING up

■ SQL know-how can do a lot to boost a career. *Page 93*

MARKETPLACE

■ Buying network inventory management software? Watch out for product weaknesses that vendors may not disclose. *Page 102*

COMPUTER INDUSTRY

■ Israeli software firms find opportunities plentiful in the U.S. *Page 109*

COMMENTARY

■ Paul Strassman says that under the fancy trappings, re-engineering is the same bitter medicine we've always had to take for overindulgence. *Page 33*

■ Before you worry about computer systems and software, Esther Dyson suggests you figure out the operating system. *Page 33*

■ Asynchronous Transfer Mode isn't perfect, Charles Babcock says, but there are good reasons why network suppliers are suddenly going gaga over it. *Page 36*

■ Personal digital assistants aren't toys, Jeffrey Henning writes. Eventually, they'll be an important part of corporate computing. *Page 49*

Calendar ..... *Page 87*
Company Index ..... *Page 107*
Editorial/Letters to the editor ..... *Page 32*
Friday Stock Ticker ..... *Page 108*

Executive Briefing

It's time to start thinking about security issues with wireless technology. New products and services hitting the market have great end-user appeal but introduce considerable new risks, according to experts. *Page 1.* **And risks will only increase as providers start to roll out very high-capacity wireless nets that rival fiber-optic capacity.** *Page 63*

The lure of groupware is also strong but somewhat risky. The market is proving irresistible for many vendors. Apple just announced a groupware initiative, and even companies such as DEC and Eastman Kodak are getting in on the act. *Page 14.* **And customers are finding plenty of applications. For example, American Airlines plans to expand its Sabre reservation system to accept reservations via fax or E-mail, with E-mail confirmation.** *Page 14.* **But there's a downside. Users complain that integration of multiple E-mail systems is often difficult (***page 85***), and many are losing patience with vendors' inability to agree on standards.** *Page 15*

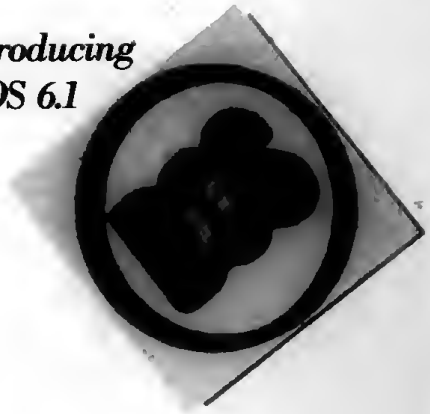
In the meantime, vendors are pushing groupware into a spectrum of new areas, including client/server, object orientation, multimedia and video (*page 14***), blurring lines in a manner not unlike what's happening in the convergence of multimedia applications and cable-based interactive television.** *Page 89*

The practical intersection of computer and consumer technology may seem a long way off, but it has already started to affect careers. The promotion of Viacom CIO Henry Leingang to senior vice president at that company signals the growing importance of technologists in the mass-media business. *Page 24.*

At somewhat less elevated levels, the explosion of new computer/media combinations has touched off a mini hiring boom for multimedia specialists and holds promise for many more other types of IS professionals, including network and database administrators. The best qualification is knowledge of C++ because most new authoring systems for multimedia are object-based. *Page 89*

Microsoft is reportedly hoping to use its 32-bit version of Visual C++ as an extra tie to bind users to Windows and Windows NT. Competition is heating up, and the theory is that whoever controls the development environment will control the operating system. *Page 8*

Introducing
PC DOS 6.1



We just did MS-DOS 6.0 one better.

It's the new PC DOS 6.1 from IBM. And it one-ups MS-DOS® 6 for a lot of reasons.

For one, it's got improved memory management. The Memory Optimizer not only gives users more memory, but also a configuration watcher to run the system more efficiently.

It's got utilities you don't get with MS-DOS. For instance, you get a Program Scheduler for any program or DOS command, and a new editor that allows you to edit files at the same time.

It's got features you don't get with MS-DOS. Such as support for PCMCIA Card Services (i.e., hot plugability for portable users), and the industry's leading Pen support for DOS.

And there's one more reason that goes beyond the software—PC DOS 6.1 is backed by superior service and support, including a 24-hour helpline you can actually reach. What's more, the first 60 days of support are free.

So if you haven't got PC DOS 6.1, get it from your local software dealer. Or call 1 800 342-6672.

Features and Functions	PC DOS 6.1	MS-DOS 6
Backup—Tape support; High-speed floppy disk support	x	
	x	
Approximate number of viruses that can be detected	>1,400	800
Automated system configuration optimizer	x	
PCMCIA II support	x	
Enhanced editor	x	
Program scheduler	x	

(In Canada, call 1 800 465-7999.)

When you consider all it's got, PC DOS 6.1 from IBM is definitely the one to get.

IBM®

IBM is a registered trademark of International Business Machines Corporation. MS-DOS is a registered trademark of Microsoft Corporation. © 1993 IBM Corp.

Wanted: Investors to buy Taligent stock

[illegible] by a need to expand support for Taligent, [illegible] and Apple have revised some terms of [illegible] currently [illegible] investors time to do [illegible] work.

[illegible] Microsystems, Inc. [illegible] expressed interest in buying into the venture, [illegible] They added that discussions [illegible] with HP, although a deal has not yet been closed.

Neither company would comment on negotiations.

IBM and Apple are not selling pieces of their stake in the Taligent venture, but the new classes of stock will dilute their holdings, sources said.

According to analysts, this was a natural progression for Taligent.

"IBM and Apple never meant this thing to be a closed effort," said Frank Dzubeck, president of Communication Networks Architects, Inc. in Washington, D.C.

— Michael Fitzgerald and James Daly

Motorola eyes NT for PowerPC

Takes license, but IBM drags feet on port

By Michael Fitzgerald

Microsoft Corp.'s Windows NT is sneaking through the back door into the PowerPC alliance formed by Motorola, Inc., IBM and Apple Computer, Inc. But, politics being what they are, none of the companies involved are talking about it through official channels.

Sources close to the deal confirmed a published report that Motorola has licensed NT from Microsoft. But neither company officially confirmed the agreement, in part because IBM so far is refusing to say it will announce a Windows NT-based version of PowerPC in its initial PowerPC workstations, according to sources.

Observers were split on the reasons behind IBM's reluctance to come out strongly in favor of NT on PowerPC. The PowerPC will be used in systems ranging from IBM's RISC System/6000 workstations to low-end portables expected sometime in 1994.

"There's a lot of questions in the market about whether NT will do anything on the desktop, so why should IBM help it out?" said William Bluestein, an analyst at Forrester Research, Inc. in Cambridge, Mass.

NT needed

Other analysts disagreed, saying NT support was crucial to PowerPC's future.

Part of the problem is "IBM has multiple groups needing to buy in, instead of just one," which is slowing NT's acceptance within Big Blue, said Frank Dzubeck, president of Communication Network Architects, Inc. in Washington, D.C. "It's not a question of [OS/2 operations czar Lee] Reiswig saying not to do that," Dzubeck added.

Sources close to IBM said the company fully intends to support NT, but it will let Motorola take the lead in porting it to PowerPC. Both Motorola and IBM recognize how important it is to PowerPC's future for NT to run on the chip, the sources said.

But IBM has focused its development resources on WorkPlace OS, which will run both AIX and OS/2. It is an environment that will lead users to Taligent, IBM and Apple's joint object-oriented operating system venture.

A Microsoft Corp. spokeswoman said it is in Microsoft's best interest to make sure any company that licenses NT succeeds with its port.

"It's a pretty amazing deal for Microsoft — they get something that really helps NT, which is performing slowly on Intel platforms, and got Motorola to pay for it," said Jesse Berst, publisher of the "Windows Watcher" newsletter in Redmond, Wash.

Subnotebooks

Smaller, but better portables arrive

By Michael Fitzgerald

Small packages are starting to contain better things.

Gateway 2000, Inc. highlighted this trend last week by introducing a version of its 2.9-pound HandBook with an Intel Corp. 1486 chip in it, joining IBM PC Co., Hewlett-Packard Co., Zeos International Ltd. and CompUSA, Inc.'s Compudyne subsidiary, among others, in the subnotebook category. Sources said Zenith Data Systems will upgrade its Z-Lite subnotebook to include a 486 chip later this month, and Compaq Computer Corp. will follow in the fourth quarter with a 3.8-pound subnotebook that uses Intel's 25-MHz SL-enhanced 486SX.

The Compaq box will come in two versions: one with an 85M-byte hard drive and one with a 125M-byte hard drive. It will also compete head-to-head with the HandBook in terms of pricing, the sources said. The HandBook costs $1,495 with a 25-MHz 486SX processor, and a HandBook with a 20/40-MHz DX2 chip and a 130M-byte hard drive will cost $1,995. The unannounced Compaq product is expected to cost $1,499 with the 85M-byte hard drive and $1,699 with the larger drive.

Compaq will also address one of the main usability problems of subnotebooks by building a battery-powered 3.5-in. floppy that can be attached to the machine's Personal Computer Memory Card International Association slot, the sources said. The box will also offer an integrated trackball on the lower-right corner with the buttons built into the side of the screen.

Sources said the box is similar in size to the PC Co.'s 10.1- by 7.5-in. ThinkPad 500, with a "90% keyboard."

Compaq officials refused to comment.

Pleasing options

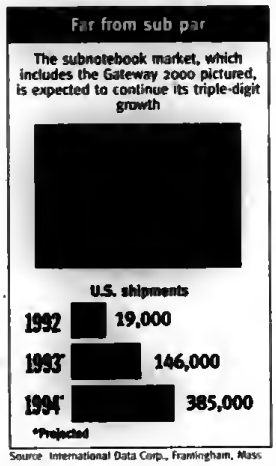
Analysts said they like the new crop of machines. "We have some good products in the market now, and users can choose from an array of Windows machines instead of receding-edge technologies like 286s and CGA screens," said Bruce Stephen, director of PC hardware and pricing research at International Data Corp. in Framingham, Mass.

Some users said they were looking seriously at the subnotebook category, which has drawn only nominal interest but is poised for a growth surge (see chart).

"We have a group with a need for 50 laptops and with having to carry a printer as well, subnotebooks could be ideal," said Roger Rush, microsystems manager at Diversey Corp., a chemical manufacturer in Livonia, Mich.

"I would expect we'll use both notebooks and subnotebooks here, depending on our user needs," said John W. Good, manager of information technology at The Turner Corp., a multinational construction company based in New York. Good said the activity in the subnotebook market had him interested in evaluating the products, to see whether less heavy-duty computer users would prefer the lighter, floppy-less subnotebooks over their heavier cousins.

Other users said they felt the products on the market were still not quite ready for prime time.



Source: International Data Corp., Framingham, Mass.

"I like anything that's lightweight, and I like that they're coming with 486s. At some point I would like to assign these to my people," said Stephen Ades, director of information systems at States Nitewear, Inc. in New Bedford, Mass. Ades cited small screens and hard drives as reasons why subnotebooks were still "not really workable. They're getting better, but for the extra couple of pounds I'll stick with notebooks for now."

The new class of subnotebooks varies according to vendor. HP's OmniBook 300, for example, uses a 486 processor and backlit screens. Analysts said it was still not clear whether the OmniBook's numerous features, such as read-only memory-based software, wireless communications and the ability to run on alkaline batteries, would help it beat systems built with faster processors and brighter screens.

Subnotebooks appear to be an important developing category and one that IS managers should adopt a proactive stance toward, analysts said.

"IS will really have to pay attention to these because they'll be so cheap that a lot of individuals will buy them, and all of a sudden IS will see this menagerie of boxes that people will want to have them support," said William Bluestein, an analyst at Forrester Research, Inc. in Cambridge, Mass.

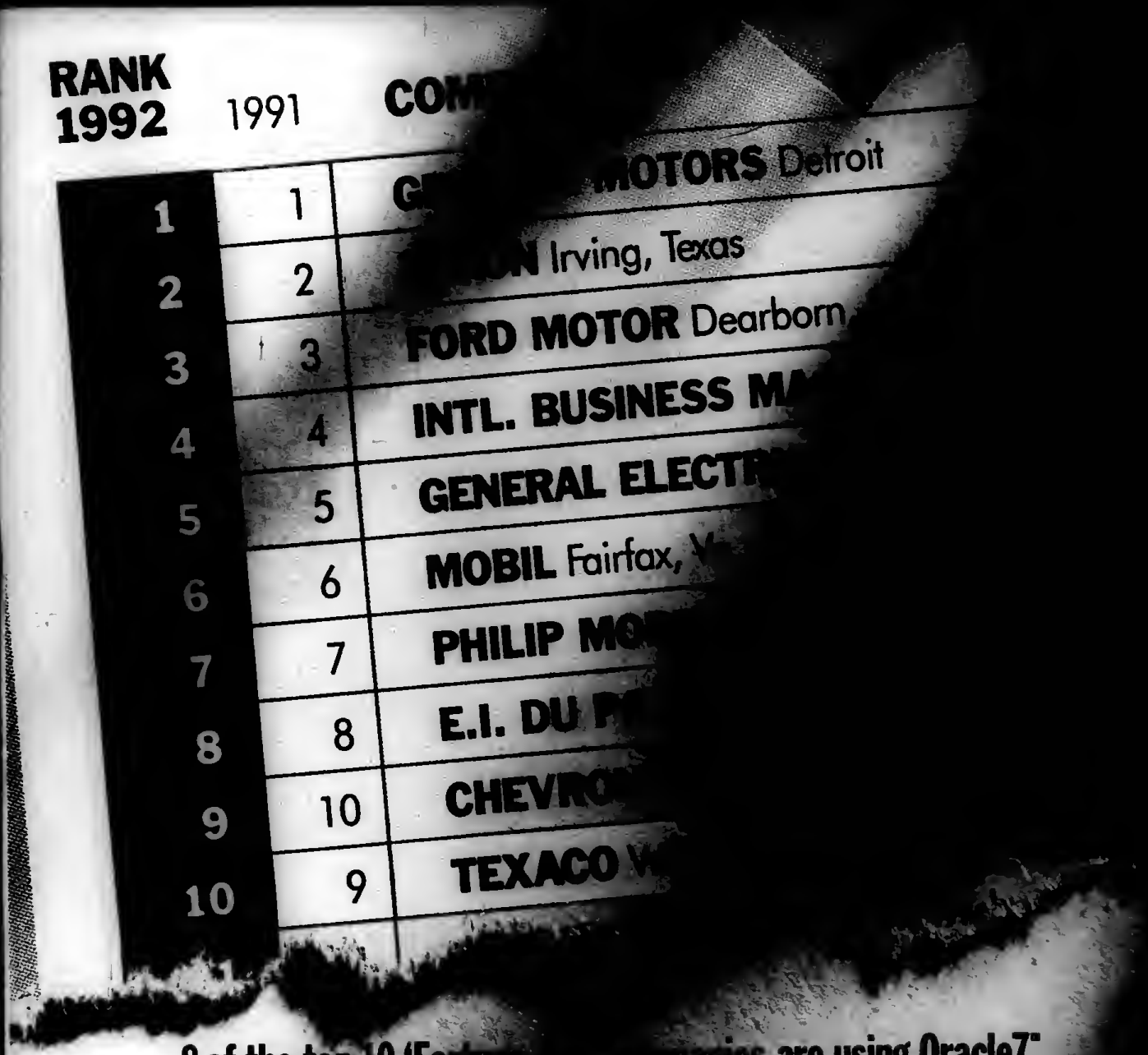
Users and analysts were not clear how subnotebooks will fare against pen-based systems such as the AT&T EO Personal Communicator. But declining subnotebook prices will likely create more user interest.

"They're still too expensive for a computer that doesn't have the full capabilities of a notebook," said Enrique Crespo Jr., manager of corporate sales systems at The Torrington Co., a bearing maker in Torrington, Conn.

Corrections

- Because of an editing error in the Aug. 9 issue, the chart on page 16 was mislabeled. Commercial data processing makes up the lion's share of parallel processing.

- A story in the Aug. 9 issue incorrectly stated that Standard Microsystems Corp.'s new 16-bit Ethernet adapters do not perform error-checking.



8 of the top 10 'For ... panies are using Oracle7.

Here's what our customers are saying about Oracle7:

"It's the driving force behind our most sophisticated applications."
"You can't break it, it just keeps running and running."
"It's the best Client/Server solution out there."
"We needed a truly open solution: Oracle7 is it."

To find out more about why companies of all sizes are choosing Oracle7, call. We'll send you in-depth analysis from IDC and Aberdeen, and you'll see for yourself why everyone is so excited. 1-800-633-1071 Ext.8120

ORACLE

©1993 Oracle Corporation. Fortune is a trademark of Time Inc.

News Shorts

IBM software chief resigns

Earl Wheeler, a 38-year IBMer and for the past five years general manager of IBM's Programming Systems business, will retire on Aug. 31. Stepping in as head of Programming Systems is Steven Mills, who has held various jobs at the division. Wheeler, 59, is heading to Hilton Head, S.C. Wheeler said he foresees no major reorganization of the division.

Feds award $50 million in contracts

American Management Systems, Inc. (AMS), a software and services firm in Arlington, Va., won two information systems contracts with the U.S. Department of Defense that could amount to $50 million over five years. One contract is with the headquarters of the Department of the Army for systems development and management. In the other, AMS will help the Defense Information Systems Agency centralize, standardize and streamline systems throughout the Defense Department.

CFO survey supports IS outsourcing

A survey of some 365 chief financial officers conducted by DePaul University's School of Accountancy found 92% planned to continue or increase IS outsourcing at their company. Cost savings is not the reason CFOs are smiling — access to expertise stood out as the greatest benefit of outsourcing, followed by concentration of management's attention on main business issues. Savings from staff reduction, software licenses and space reduction all rated lower.

Dealing with CA: The report

Saying it is responding to an undercurrent of unrest among customers of Computer Associates International, Inc., International Computer Negotiations, Inc. in Winter Park, Fla., has released a 304-page report titled "Dealing with Computer Associates." The $795 report contains exhaustive analysis of CA licensing policies, sales techniques and corporate organization and recommends specific tactics that customers should take to control the negotiating process. Chief recommendation: Get everything in writing.

They're ba-a-ack, at DEC

Several members of Digital Equipment Corp.'s original Alpha development team are returning to the company, including Jim Montanaro, Gary Hoeppner, Ray Stephany and Gerry Cheney. They will join Rich Witek at the Palo Alto (Calif.) Design Center when it opens next month to focus on the development of low-power, low-cost Alpha AXP microprocessors for the mobile and wireless computing markets.

KnowledgeWare losses narrow

KnowledgeWare, Inc. posted fourth-quarter net profits of $2.7 million, narrowing its fiscal 1993 loss to $25.8 million. The loss was due in part to third-quarter restructuring charges. The Atlanta applications tools company earned $2.3 million in last year's fourth quarter. Revenue for the fourth quarter ended June 30 was up 15% to $40.4 million. Fiscal 1993 sales were $128.7 million, up 9% from the year-earlier period.

SHORT TAKES AT&T and its NCR Corp. subsidiary have developed an agent that is said to allow Simple Network Management Protocol-based systems to manage AT&T's Definity Communications System line of digital private branch exchange systems. ... In the latest step in a pungent court battle, Microsoft Corp. asked a federal court to enjoin Stac Electronics, Inc. from selling its latest release of Stacker 3.1 for Windows and DOS, claiming theft of trade secrets.

More news shorts, *page 16*

DOD IS revamp at crossroads

New IS chief reaffirms CIM plan despite funding, CASE setback

By Gary H. Anthes
WASHINGTON D.C.

Lt. Gen. Emmett Paige Jr., the Pentagon's new information systems chief, said last week that despite apparent backpedaling, the U.S. Department of Defense (DOD) remains strongly committed to its mammoth systems modernization effort.

Paige, who was officially sworn in two weeks ago as assistant secretary of defense for command, control, communications and intelligence, said the concepts behind the Corporate Information Management (CIM) initiative enjoy broad support among top civilian officials and military officers.

Asked about rumors that CIM is in danger of collapsing, former communications specialist Paige responded by tapping out in Morse code an eight-letter barnyard expletive.

Doubts abound

Despite the reaffirmation, recent events have called into question the Defense Department's wholehearted commitment to the program — put together during the Bush administration — which is intended to save billions of dollars through software standardization and reuse, facilities consolidation and business process re-engineering [CW, June 8, 1992].

Asked about CIM being in danger of collapsing the new IS chief responded by tapping out in Morse code an eight-letter expletive

Two weeks ago the House Armed Services Committee recommended that Congress withhold $315 million from the Pentagon's IS budget request for next year. The committee said the Defense Department had not presented a persuasive cost-saving plan for CIM, and, it said, "There are growing indications the department is moving to dismantle major portions of the initiative."

As acting IS chief, Paige, in June, reversed a September 1992 order to consolidate the software development facilities of the military branches under a new central agency. The decision was made in response to complaints that the consolidation would move applications support too far away from users. However, he let stand an order to consolidate data processing facilities and reaffirmed an earlier commitment to reduce the number of legacy systems throughout the department.

In May, Deputy Defense Secretary William E. Perry signed a memo, drafted by Paige, that downsized plans for a huge initiative called Integrated Computer-Aided Software Engineering (ICASE). A cornerstone of CIM, ICASE was to have instigated a half-billion dollar purchase of CASE technologies that would become the standard tool box for the entire Defense Department. Instead, Paige said the procurement would be limited to pilot tests of CASE tools, worth perhaps only $20 million.

"Over half the CIM program is being either canceled or crippled," said Paul Strassmann, CIM architect and former director of defense information. He said the decision not to consolidate the software activities will make it more difficult to achieve the standardized architecture and interoperability that are at the heart of CIM. "They just went back to the status quo, without any plan," he added.

An official at the General Accounting Office (GAO), which is studying the issue, said the recent pullback is troubling.

"If you don't have centralized control of applications, the services are just going to go ahead and do what they have always been doing, and money is going to keep getting spent on redundant systems," said Frank Deffer, assistant director of the GAO's Accounting and Information Management Division.

'Total baloney'

Strassmann labeled as "total baloney" an assertion that CASE technology is not sufficiently mature to justify a huge Defense Department commitment at this time. "ICASE was a very important part of the technological glue for CIM," he said. "But ICASE is crippled; it's being nibbled to death by ducks."

Denis Brown, former director of the Center for Information Management at the Pentagon, said there is a natural loss of momentum in big programs when top management changes, but he predicted that Paige would pursue the core concepts of CIM.

Brown said it was a good idea to move ahead with the data center consolidations while holding off on the software facilities, giving the military services "a chance to gain some acceptance of the concept of consolidation and to see that it can work and can save money."

On the warpath

Lt. Gen. Emmett Paige Jr. offered his thoughts on the following:

On the data standardization effort under CIM: "I'm told we don't yet have a single data element standardized in all of DOD. I will not accept that as an answer."

On the importance of business process re-engineering: "If I were president, I would just issue an executive order: Thou shalt do it."

On Defense Department-wide megaprocurements: "I do not favor the large procurements like Desktop IV. I'd prefer to see the military departments given the authority to do their own procurements."

On mainframes: "We hope to migrate away from mainframes. Client/server will stand quite well" for new applications while mainframes remain for the legacy applications.

On the DOD's Ada mandate: "Ada is not dead. I don't intend to kill the Ada mandate, and I don't intend to let Ada stagnate."

On computers at the Pentagon: "I'd hate to tell you what I'm using. Office automation at the Pentagon is the worst I have ever seen."

— Gary H. Anthes

GTE names Systematics sole outsourcer

By Jean S. Bozman
ATLANTA

GTE Corp. is consolidating multiple contracts for data center services, back-office support and software development into one outsourcing contract.

GTE's $4 billion Telecommunications Products and Services Group said last week that it will consolidate two outsourced data center operations that separately handle bill processing for its Contel Cellular, Inc. and GTE Mobilnet, Inc. cellular customers. The data centers also provide processing cycles for several outside software development groups.

Systematics Telecommunications Services, Inc. in Little Rock, Ark., a $579 million outsourcing firm owned by cellular provider Alltel Corp., gained the 10-year GTE outsourcing contract for an undisclosed sum. The billing system will track the accounts of 1.3 million GTE cellular telephone customers.

"Systematics is offering us a complete front-end to back-end billing service, and we think we will benefit from economies of scale," GTE spokesman Jeff Keller explained.

GTE will enhance Systematics' Virtuoso billing and customer service system to support GTE's cellular business. Virtuoso is used by Alltel, three Canadian companies and two small U.S. firms.

George Kerns, assistant vice president of cellular information management operations, said the consolidation was planned when GTE acquired Contel in 1991. Most traditional information systems functions for the $1 billion cellular business unit have already been outsourced. "We're looking to drive down information systems costs as a percentage of revenues," Kerns said.

Kerns' 190-person information management staff will handle systems design and analysis for GTE's cellular business. "Our [information management] group will always be the interface between the business operations and the outside vendor," he said.

Staffers at other GTE units in New York and Dallas that handled the former cellular billing contracts will be redirected to other projects or join Systematics.

The transition to a merged back-office operation could take 12 to 18 months as Contel's billing applications are hosted on Digital Equipment Corp. VAXs and must be converted to run on IBM Application System/400s and mainframes.

Borland loses macro round in copyright suit

By Mitch Betts
BOSTON

A federal judge ruled late last week that a key compatibility feature in Borland International, Inc.'s Quattro Pro spreadsheet software that allows it to run user-written Lotus 1-2-3 macros infringes on Lotus Development Corp.'s copyright.

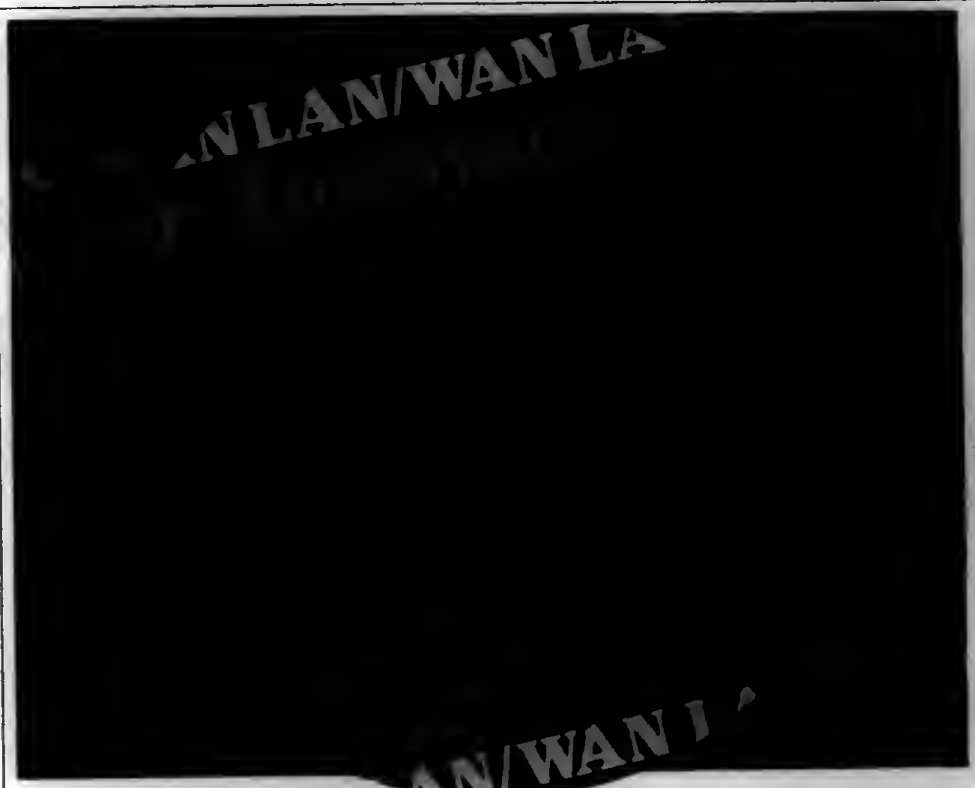
Borland characterized the ruling as a "broadside attack on consumers' rights to use compatible software products," but Lotus said it merely means the "macro key reader" in Quattro Pro is illegal.

Quattro Pro users with 1-2-3 macros are not in any legal jeopardy because they did not copy the software feature, said J. T. Westermeier, a partner at Fenwick & West in Washington, D.C., and an expert on computer law. If the decision stands, Borland will have to pay damages and either remove the feature or replace it with a noninfringing equivalent.

The ruling by U.S. District Court Judge Robert E. Keeton was the last in a series of pro-Lotus decisions in the suit filed in 1990. Borland called it an "unprecedented overexpansion of copyright law" and said it plans an immediate appeal.

"Most legal commentators believe Judge Keeton has gone a little too far in pushing the copyright edge," Westermeier said.

Borland said last week's decision means users cannot use their own 1-2-3 macros in non-Lotus products. But Lotus denied that statement and said Borland is trying to sow confusion.



UDS is Fully Focused on Digital Datacomm

In the accelerating transition from analog to digital datacomm, only UDS has a full line of switched digital devices that communicate across all predominant access technologies (ISDN, Datapath, Switched DDS).

Products are fully developed and ready for shipment to datacomm users whose systems utilize DDS, switched digital, T1, fractional T1, ISDN or any combination of these advanced communications technologies.

UDS digital products include multi-rate DSU/CSUs with speeds to 56/64 kbps, DSU/CSUs for T1 and fractional T1 applications, frame relay, statistical and time-division multiplexers and a broad range of ISDN terminal adapters and network termination units.

Standalone models of UDS digital datacomm products are easily convertible for space-saving, rack-mounted installation in UDS Data Shelf™ enclosures.

Unlike other manufacturers who offer narrow product lines for limited applications, UDS offers a full migration path to all-digital networking.

For complete product information and help in configuring your digital datacomm system, call

800/451-2369

MOTOROLA
UDS

Datapath is a trademark used under license by Northern Telecom, Inc.

Sparks fly in C++ development battle

By Melinda-Carol Ballou

Microsoft Corp. and Symantec Corp. will up the ante in the C++ wars when they officially unveil their 32-bit development environments. Borland International, Inc., meanwhile, is quietly preparing a counterattack that targets Microsoft with a 32-bit version expected to ship this fall, industry sources said.

Users praised the competition, saying it can only improve the quality of the tools.

New with the 32-bit edition of Microsoft's Visual C++ are the following features: debugger support for multithreaded applications and for Windows NT-style exceptions, Win32s libraries to run applications on Windows NT or on Windows 3.1 and an integrated profiler.

The 32-bit version of the product is "almost identical" to the 16-bit version in other ways, and moving applications is straightforward, a beta-test user said.

However, controls available with 16-bit Visual C++ and with Visual Basic have not yet been ported, he said. Other users criticized the lack of exception-handling and templates with both Microsoft Visual C++ versions.

"Exceptions are really important because what happens if the application fails?" asked Don MacDonald, information systems officer at Chemical Banking Corp. in New York. "We need to be able to throw an exception in and get the machine back to a stable state."

Other tools, including those from Symantec, Borland and Watcom International, Inc., offer support for templates. Watcom also does exceptions.

The desktop mix

C++ vendors and the desktop operating systems supported

	DOS	OS/2	Windows 3.1	Windows NT	Apple System 7
Borland	✓	✓	✓	✓+	
Metaware	✓	✓•	✓	✓+	
Microsoft		✓	✓	✓+	
Symantec	✓	✓•	✓	✓+	✓
Watcom	✓	✓•	✓	✓+	

• = Extended 32-bit + = Win32s

Symantec's C++ Professional 6.0 is compatible with Microsoft Visual C++ and Borland Application Frameworks 3.1, enabling users to migrate their applications. It supports Microsoft Foundation Classes with its C++ compiler for 16- and 32-bit code generation and offers the Win32s system hosted on Windows 3.1.

Three versions of the Symantec environment are available for different expertise levels. The product includes an integrated development and debugging environment and multiple independent views of the applications, as well as a graphical user interface to Intersolv Corp.'s PVCS version control software, visual prototyping and code-generation tools and a linker.

Borland C++ for Win32s will offer full C++ exception handling and ObjectWindows 2.0, an application development framework for Windows and Windows NT that will include high-level controls and visual tools and ObjectWindows Class Library 2.0. Sources said Borland is talking to other C++ vendors (excluding Microsoft) to allow ObjectWindows applications to be portable across multiple compilers, as are Symantec's and Watcom's.

The implications of the C++ battle go much further than a tit-for-tat fight over features to include the wider industry conflict over future operating systems.

Whichever vendor controls the development environment will control the operating system, and therefore, Visual C++ makes it very easy to get into the Windows environment and much more difficult to get off, said Michael Schneider, a vice president at Gartner Group, Inc., a consultancy in Stamford, Conn. "What Microsoft is hoping is that Visual C++ users will remain married for life to Windows and Windows NT," he said.

Borland, Symantec, Watcom and Metaware support a greater range of operating systems than Microsoft (see chart). Borland also describes a more generic windowing environment with its class libraries. This is attractive to users seeking greater independence from Microsoft, but others want the close affiliation with Windows.

Whither wireless security?

CONTINUED FROM PAGE 1

Because all methods of wireless data transfer are accomplished by devices that are essentially radio transmitters, anyone with the right receiver can tune into your voice or data transmission. "Ask Princess Diana how problematic it can be if someone is tapping into your phone conversation," Geisler said.

Grabbing data out of the air can be a simple task. For about $1,800, a voice and data traffic monitoring system can be set up using the Icom Corp. R7000 receiver and Advanced Electronic Applications, Inc.'s Packrat decoder, according to Bob Hatter, retail manager at the Electronic Equipment Bank in Vienna, Va.

Hatter sells the setup to shortwave radio operators and reminds them of the illegality of abuse. "People shouldn't be out there vacuuming the atmosphere looking for every scrap of information about everyone," he says.

Security experts said the best way to safeguard sensitive data — whether it is transmitted over the airwaves or not — is to encrypt it. "It doesn't matter if someone can pick up your signal if they can't read it," said David Frankland, vice president of Digital Ocean, Inc., a wireless products provider in Overland Park, Kan.

Still, users should proceed cautiously. "Don't kid yourself: You're not going to duplicate the type of security you have on a mainframe," said Tom DeWald, manager of technical development at Mastercard International, Inc. in St. Louis, who is encrypting data sent via wireless devices.

Within a local area, infrared and spread spectrum are the most common methods of wireless connectivity. Both broadcast only a short distance, so an eavesdropper has to be close. Control the personnel flow within a transmission zone and you effectively control who sees the information. "It's not quite airtight, but it's workable," Geisler said.

Safe and scattered

The nature of spread-spectrum technology requires the data transmitted to be broken up and spread over a range of radio frequencies, rather than broadcast at a single frequency. The data is then reassembled at the receiving end. Some spread-spectrum network vendors claim it is technologically more difficult to decode a spread-spectrum broadcast than it is to read encoded network packets transmitted through traditional cabling systems. That is because the signals are scattered over many frequencies and have to first be decoded, then reassembled for the data to make sense.

Communications strategies that involve a network carrier — for example, cellular phone networks — are also fraught with danger. Although illegal, many people scan the cellular frequencies and listen in on voice frequencies in the same way people scan police and fire frequencies.

Radio IDs

Some companies are exploring other options, such as the Ardis packet radio data network, which is widely available throughout the U.S. This type of network identifies each radio by its unique identification number and only connects with packet radio systems on the user's authorization list.

In addition, the radio transmission is broken up into data packets that the system reassembles back into a meaningful data stream. Because these packets may arrive intermixed with those from other subscriber units, it makes random interception of data substantially more difficult, Geisler said.

But there's a downside: The randomness of the arrival of the data packets can give slow response time when using an application online. Cellular transmissions can also be noisy and cause data errors or prolong the connect time.

Ultimately, wireless security awareness must be emphasized at an end-user level. "Users need to take control of their own environment by encrypting data and making sure that they take safeguards in its transmission," said Fritz Wagner, manager of corporate electronic information security at Du Pont Co. "The IS guys can't do it all."

Invisible predator

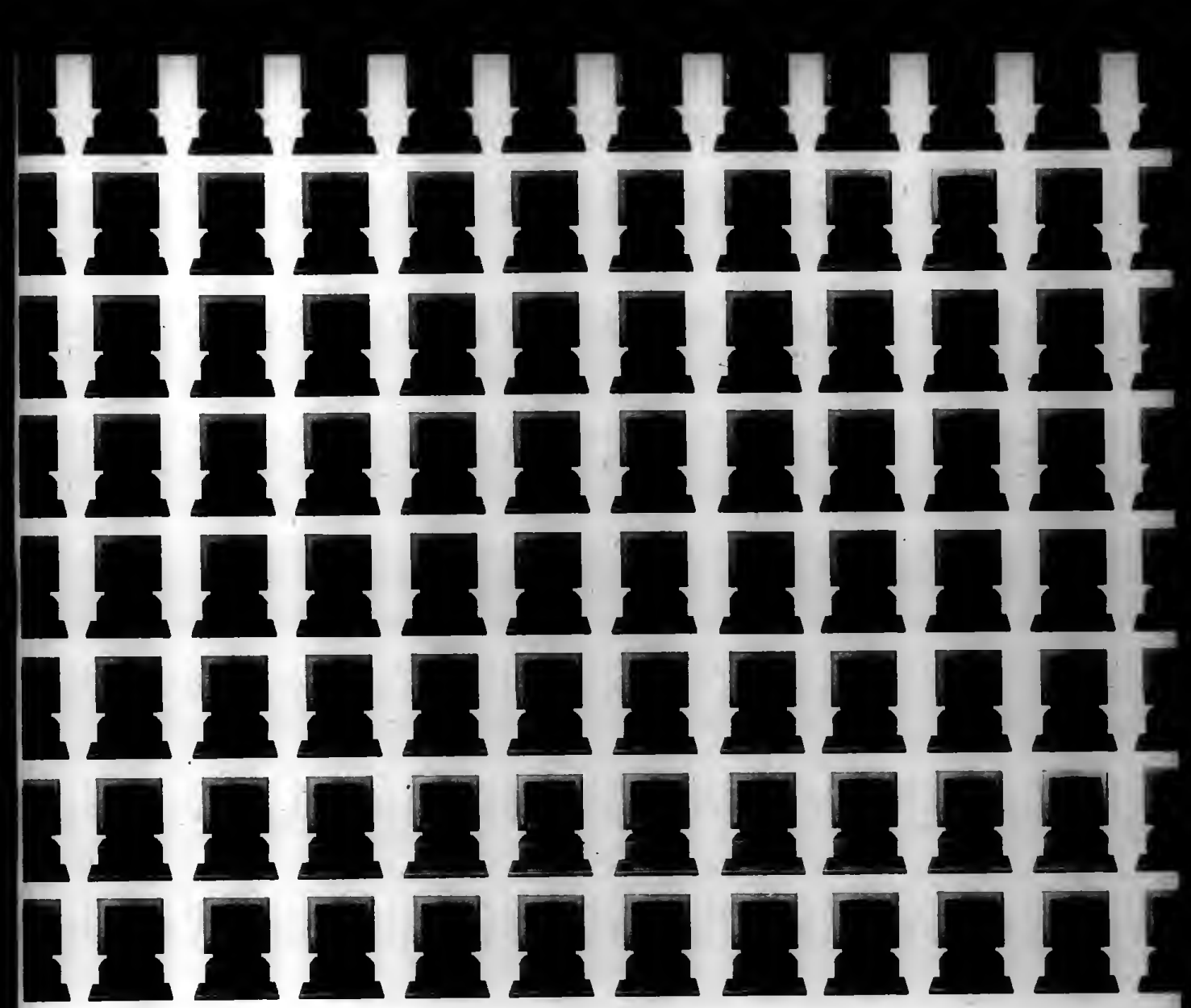
How data transmitted over a wireless network can be intercepted

Worry-free wireless?

Dennis Walicsek does not think much of the theory that wireless data transmission is inherently more dangerous than traditional land-line methods. At least he is not going to stand in the way of a good thing.

"It's not like we're transporting state secrets," said Walicsek, the vice president of information systems at Dry Storage Corp. in Des Plaines, Ill. Walicsek has 200 trucks with handheld wireless machines from Telxon Corp. that dispatchers use to keep close tabs on the whereabouts of goods being trucked across the country.

Password protection is their only form of security, but Walicsek does not seem to mind. "The advantages are too great to be hobbled by the possibility of what might happen," Walicsek said. In fact, he claims that a wireless network can be more secure than a land-line system. "Wireless is a lot less susceptible to the casual hacker," he said. —*James Daly*



WE'VE JUST CREATED THOUSANDS OF NEW REASONS WHY IT'S A GREAT TIME TO BUY A COMPAQ DESKPRO.

And they're all available right now. The COMPAQ DESKPRO/i, the DESKPRO/M and a wide array of COMPAQ Monitors. Not only have we boosted production, but we've enhanced video performance by up to 45%. And now get great savings. Call your COMPAQ Reseller and ask about the Total System Promotion. Or for a reseller near you call 1-800-638-8258 ext. 560. There's no reason not to. COMPAQ

© 1993 Compaq Computer Corporation. All Rights Reserved. COMPAQ DESKPRO Registered U.S. Patent and Trademark Office. Total System Promotion is available for a limited time at participating Authorized COMPAQ Reseller locations. Consult your reseller for details.

Sybase tool set

CONTINUED FROM PAGE 1

it looks like we can, we'll probably move back," he said.

Windows support is key for Chevron, Soper said. Sybase's unification plan includes a Windows-compliant graphical user interface builder to update character-based APT Workbench applications.

Sybase is also expected to do the following:

•Link Deft front-end modeling and design tools to application generators from computer-aided software engineering makers such as Texas instruments, Inc. and intersolv, Inc. by publishing application programming interfaces.

•Extend object-oriented functions with a product, code-named Calypso, designed to add front-end analysis, design and modeling features to recently acquired object-oriented tool GainMomentum.

•Offer re-engineering functions to help users reverse-engineer existing Sybase applications into a central repository. The programs could then be regenerated into object technology.

Sybase declined to comment on the upcoming announcement, but a spokeswoman acknowledged that pieces will be released in phases until the end of 1994. GainMomentum 2.0, which shipped last month, is the first component.

However, at least some terrain that Sybase has allowed third parties to take is likely gone for good.

United Grain Growers Ltd. bought $200,000 worth of Powersoft's PowerBuilder application at the behest of Sybase.

"I see no logical reason to switch now," said Terence Light, manager of systems development. "We're committed to PowerBuilder." The Winnepeg, Manitoba, agricultural firm is in the middle of a $2 million client/server project anchored by Sybase's SQL Server.

Nevertheless, ballooning demand for tools means enough room for Sybase, analysts agreed. Development aids are like cars, according to Herb Edelstein, principal at Euclid Associates, a consulting firm in Potomac, Md. Each has its own nuances and strengths, and no single product is "right," he said.

Sybase's overarching strategy is similar to Oracle Corp.'s Cooperative Development Environment in that both plans cover soup-to-nuts development, said David McGoveran, president of Alternative Technologies, a consultancy in Boulder Creek, Calif. "Presumably, these tools from database companies will be more integrated with databases than those from third parties," he said, "but that remains to be seen."

Meanwhile, Oracle lacks an object-oriented counterpunch to Sybase's GainMomentum, Edelstein noted. "Gain gives them a real step up."

'Windows first'

In what it acknowledged is a "change of direction," Oracle plans to ship a complete set of Windows-based development tools before it ships Unix versions of comparable products.

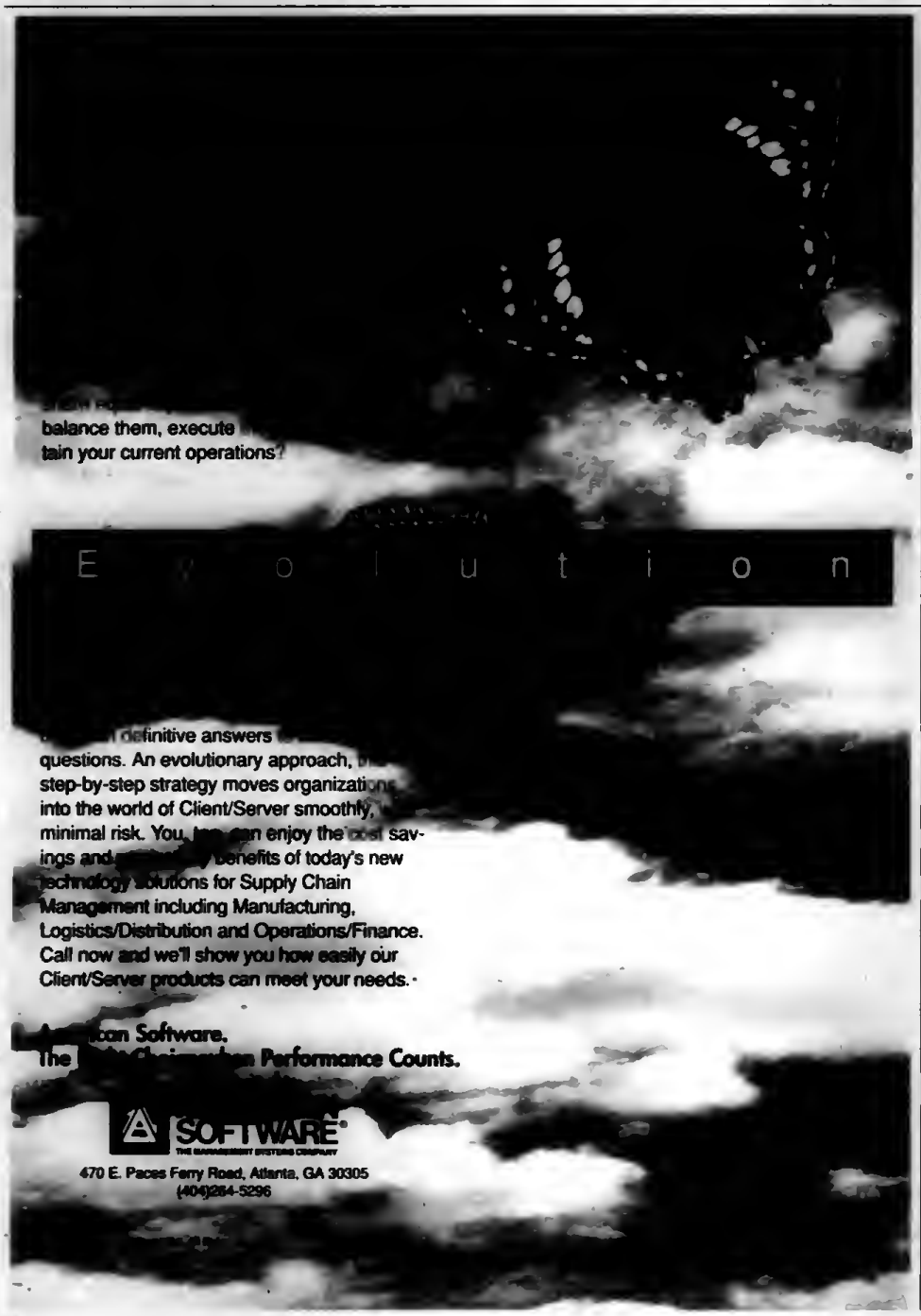
Windows editions of all the dozen or so tools under Oracle's Cooperative Development Environment (CDE) banner, announced in March, are in production except for two: SQLForms and Oracle Designer. They are scheduled to ship before Oracle's user conference at the end of next month, said Dennis Moore, director of CDE product marketing.

CDE is an umbrella term Oracle coined for a set of 14 existing and new application development tools.

Oracle's "Windows first" attitude is an attempt to appease Oracle database users who are looking to build Windows-based client/server applications, said David McGoveran, president of Alternative Technologies in Boulder Creek, Calif.

Also at the user show, Oracle is expected to announce Microsoft Windows NT versions of SQLForms and other tools; however, Moore declined to comment.

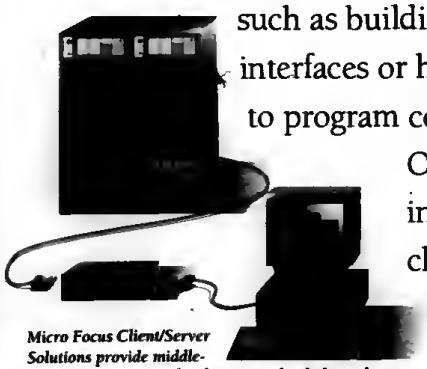
—Kim S. Nash



You're closer to Client/Server than you think.

There are plenty of choices of GUI builders, plenty of choices of databases, there are even choices of cross-platform communications, but Micro Focus is uniquely qualified to provide complete client/server solutions for your industrial-strength applications today.

The **Micro Focus Client/Server Solutions** encompass an open framework allowing you to choose Micro Focus' best tools for tasks such as building graphical user interfaces or handling program to program communications. Or, instead, plug in the tool of your choice.



Micro Focus Client/Server Solutions provide middleware components so developers need only know how to plug into the appropriate platform.

Whether you are building applications with distributed data, distributed application code or distributed presentation services, the Micro Focus Client/Server Solution is right for you. No matter what mix of thin or thick clients, or thin or thick servers, you will find it all in one place. And, best of all, the Micro Focus Client/Server products provide a bridge from the old to the new, leveraging existing resources with the latest technology.

For a brochure on the **Micro Focus Client/Server Solution**, call **800-872-6265**. Discover how Micro Focus delivers ***"A Better Way of Programming."***™

MICRO FOCUS®

Micro Focus, Inc., 2465 East Bayshore Road, Palo Alto, CA 94303 Tel (415) 856 4161

Micro Focus is a registered trademark and "A Better Way of Programming" is a trademark of Micro Focus, Inc. All other trademarks are property of their respective companies.

GSA Contract Number: GS00K93AGS6403

Cisco changes SNA strategy

CONTINUED FROM PAGE 1

generally available, at a price many vendors call reasonable.

This step was "the death knell for APPI" because it finally quieted vendor fears that IBM would exact huge financial levies from third-party APPN providers, said James Tretter, a telecommunications manager at MultiFoods in Minneapolis.

Vendors' hands tied

IBM's licensing arrangement effectively throttled APPI in a much more direct way because it forbids vendors from enhancing or significantly changing the APPN protocol without IBM's approval, said Cisco SNA product manager Michael Zadikian.

Cisco originally announced its intention to build APPI without using APPN patents; later, however, it acknowledged that certain key capabilities demanded by users, such as interoperability between APPI and APPN nodes, would require the use of APPN code.

Another key IBM move toward APPN openness has been the creation of the APPN Implementors Workshop, a forum that allows vendors to participate in the development of APPN enhancements, according to IBM. Vendors also receive APPN enhancements, such as High Performance Routing, in time to compete effectively against IBM's own APPN offerings.

Chevron originally hoped to see the APPI Forum provide this type of free interchange around SNA internetworking; however, that hope was dashed when IBM did not join the forum, Vandell said. Now, IBM seems to be "working legitimately and honestly with vendors" within the APPN Implementors Workshop, she added.

Another key IBM move toward APPN openness has been the creation of the APPN Implementors Workshop, a forum that lets vendors participate in the development of APPN enhancements.

Overwhelming support

Vendors have shown their belief in the sincerity of IBM's perestroika by rushing to support APPN on their products (see story at right).

Some big users, too, are planning to give APPN a much closer look now that it seems to be turning into something like a true industry standard.

"We have no need for [a protocol like] APPN now, but we will as we move into more distributed systems and Application System/400s," Vandell said. However, what the company really wants IBM to provide is a seamless way to support SNA and TCP/IP, possibly through its upcoming Asynchronous Transfer Mode (ATM) products, she added.

"We are really excited about ATM and may move to it without going to APPN first," Vandell said.

Indeed, many users are still looking to run SNA over their TCP/IP backbones rather than using APPN, however open. MultiFoods, for example, uses APPN to interconnect its AS/400s, but it has no plans to implement the protocol on its routers, Tretter said. "For routing, we just use frame relay, and our Wellfleet routers encapsulate SNA on top of IP," he explained.

Cisco hopes to announce router support for IBM's APPN Network Node around the second half of next year, as was originally announced in a statement of direction a year ago, Zadikian said. The router vendor said it will propose to the APPI Forum that it either halt development on APPI or further pursue the opening of APPN.

Meanwhile, Cisco will work with a vendor group within IBM's APPN Implementors Workshop to develop an industry standard based on IBM's Data Link Switching protocol, Zadikian said. Cisco announced plans to implement the forthcoming standard on its routers by mid-1994 [CW, Aug. 9].

At issue: APPI

▼ SEPTEMBER 1992
Cisco announces it is developing APPI, an alternative to IBM's APPN protocol.

▼ OCTOBER 1992
Cisco announces the APPI Forum, a group of 13 vendors formed to develop and standardize APPI. One goal is to give the Internet Engineering Task Force (IETF) a full APPI specification by mid-1993.

▼ MARCH 1993
APPN and APPI square off at Interop '93 Spring. Attendees feel APPN is the stronger protocol.

▼ APRIL 1993
IBM hosts the APPN Implementors Workshop (AIW), a forum to involve vendors in APPN development.

Cisco initiates the formation of an AIW working group to develop an IETF standard based on IBM's Data Link Switching (DLS).

▼ AUGUST 1993
Cisco announces it will support DLS. Cisco discontinues APPI efforts and licenses APPN.

Vendors eager to hop on board

With IBM's APPN and Data Link Switching (DLS) protocols rapidly moving toward industry-standard status, a bevy of networking vendors see support of those protocols as a passport into corporations' SNA internetworking installations.

Announcements include the following:

- Some 25 vendors, including all major router vendors, have announced plans to support APPN, which provides intelligent routing and directory protocols for interconnecting resources across a peer-to-peer SNA network.
- Next week at the San Francisco Interop '93 August show, 12 vendors will demonstrate how their products can communicate via a multinode APPN network. Bridge Systems, Inc., IBM, Systems Strategies, Inc. and 3Com Corp. products will run APPN protocols in the demo. Other participating products will access the network via IBM's LU6.2 and T2.1 peer protocols, an IBM spokesman said.
- Support for APPN End Node will be part of the next release of NetWare for SAA, Novell, Inc.'s LAN-to-host gateway product, according to Gerry Machi, vice president and general manager of Novell's interoperability group. The product is due out in the first half of 1994. Novell will participate in the APPN demonstration next week.
- Proteon last week said it will ship in the first quarter of 1994 a product based on DLS, IBM's protocol for routing SNA and NetBIOS over TCP/IP. Proteon plans to implement APPN Network Node on its routers probably sometime in 1995, a company spokeswoman said.
- 3Com is slated to ship an APPN End Node product by year's end.
- Sync Research, Inc. plans to announce late this year or early next year an APPN End Node server product that will allow PCs on a LAN to participate in an APPN network without needing to run either APPN or T2.1 protocols, according to Sync Research Chief Executive Officer John Rademaker.
- Microsoft Corp. said it will release a software development kit for its SNA server for Windows NT at the Interop show.

—Elisabeth Horwitt

Novell expands host gateway strategy

By Elisabeth Horwitt
PROVO, UTAH

Novell, Inc. is preparing several initiatives designed to significantly expand the capabilities of NetWare for SAA, a NetWare Loadable Module (NLM) that provides local-area network clients with connections to the full range of IBM hosts.

Novell will announce a more enterprise-oriented version of NetWare for SAA in the first half of 1994, said Gerry Machi, vice president and general manager of Novell's interoperability group. The new version will scale up to support thousands of sessions, in contrast with the current product's 500-session limit.

It will provide more integration with Novell NetWare 4.0 NetWare Directory Service, enabling client systems to address IBM Logical Unit names, host and application names and specific data links from other LANs across the enterprise, Machi said.

The new release will also support IBM's Advanced Peer-to-Peer Networking (APPN) End Node, which will allow the gateway to automatically connect LAN clients with resources across an APPN network, Machi said.

Novell expects NetWare for SAA to bring in $80 million in revenue for fiscal 1993.

Next week at the Interop '93 August show in San Francisco, the vendor will announce an NLM that acts as a LAN gateway to Digital Equipment Corp. hosts, according to Machi. Scheduled for November shipment, the product will accept Transmission Control Protocol/Internet Protocol, Apple Computer, Inc. AppleTalk and Novell IPX traffic, and it will translate it into DEC's Local-Area Transport client-to-host protocol.

Fibre Channel switches into high gear

By Ellis Booker

Lawrence Livermore National Laboratory in Livermore, Calif., last week said it has deployed the first working prototype of the Fibre Channel implementation developed by Hewlett-Packard Co., IBM and Sun Microsystems Computer Corp.

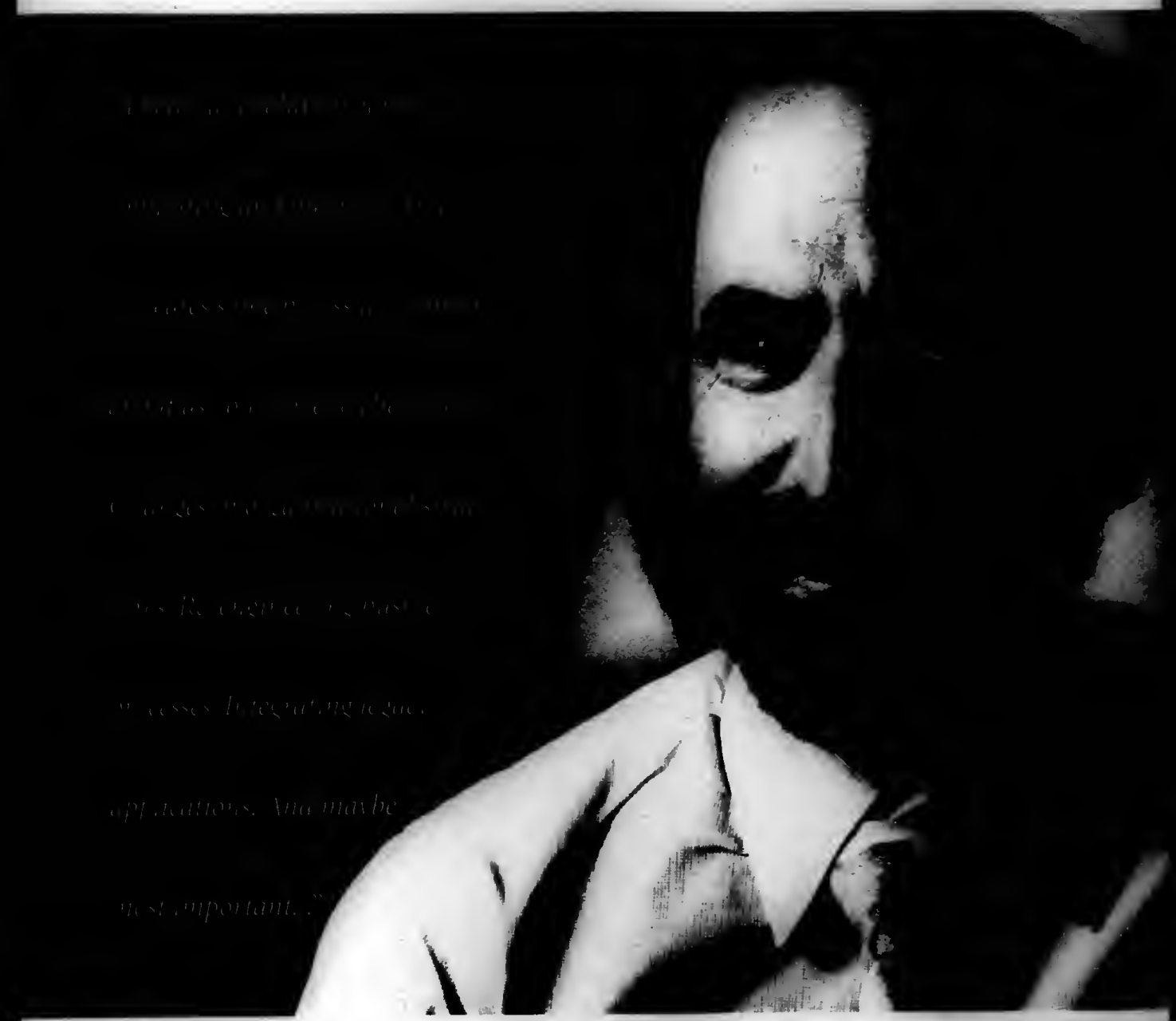
Fibre Channel supports bidirectional data speeds up to 1G bit/sec

Fibre Channel supports bidirectional data speeds of up to 1G bit/sec. over distances of up to 10 km.

Livermore, a longtime proponent of optical networking, will use Fibre Channel to connect a wide variety of computers, ranging from workstations to supercomputers.

Currently, some of the lab's most complex simulations require 160M bytes of data to be transferred from a supercomputer to a workstation, a process that takes up to 40 minutes over the center's Ethernet. The prototype Fibre Channel will reduce this to eight minutes; when full gigabit speeds are supported under Fibre Channel, this will be reduced to a mere two seconds.

SYBASE®



When Bob Epstein, Executive Vice President and a founder of Sybase, talks about computing and business, people listen. After years of developing client/server products and talking with customers, he's seen what works, and what doesn't. Hear what he has to say in a remarkably candid recorded conversation. **For your copy of *"Client/Server And The New Organization,"* call 1-800-SYBASE-1.**

Outside the U.S., call (410) 224-8044. © 1993 Sybase, Inc.

Reporter's Notebook

American Airlines is in the midst of a project to expand its Sabre airline reservation system. It plans to allow customers to make airline reservations using fax machines or PC systems running E-mail. After making the reservation, users will receive their itineraries either by fax or E-mail, said Sabre President Terrel Jones.

One of the more interesting observations to come out of the panel discussions at Groupware '93 last week was from Sheldon Laube, national director of information technology at Price Waterhouse. "With groupware, we're basically trying to reinvent the wheel. Mainframes always had groupware, but the PC companies are pretending that they invented the entire idea and that no one has done this before," Laube noted.

But then again, even companies like DEC are jumping on the groupware bandwagon. DEC announced last week that it will develop and market groupware applications based on the Virtual Notebook System (VNS) from The ForeFront Group in Houston. VNS is a distributed client/server application for Windows and Macintosh systems that supports real-time groupware activities using a document metaphor.

ForeFront also announced that its software can run simultaneously with a videoconferencing application from ViewPoint Systems in Dallas.

Meanwhile, imaging companies are starting to join the groupware drive. Last week, Imagery Software, a unit of Eastman Kodak that makes imaging software resold by Lotus and Novell, announced a $80 stand-alone PC application that can also be linked to imaging server applications. At the same time, SoftSolutions Technology Corp. in Orem, Utah, announced that it will support imaging software from Watermark Software in Burlington, Mass., in its document management software package.

Apple offers groupware preview

Will embed E-mail services into operating system

By Michael Vizard
SAN JOSE, CALIF.

■ Looking to leverage a Macintosh graphical interface that is tightly integrated with the System 7 operating system, Apple Computer, Inc. last week outlined a groupware initiative at Groupware '93 that it intends to launch in the next few weeks.

Consisting of what company executives described as PowerTalk services and PowerShare servers, the Apple groupware effort seeks to directly layer several system services, such as electronic mail and shared directories, into the System 7 operating system.

Ultimately, these services will be layered on top of other environments, including Windows, they said.

This approach differs dramatically from Lotus Development Corp.'s Notes effort in that Notes is a separate database with which applications must be integrated, said Gursharn Sidhu, technical director for collaborative systems at Apple.

In contrast, the Apple strategy, which is part of the company's Open Computing Environment architecture, calls for deploying a universal mailbox in System 7 that supports multiple E-mail systems. Each user will be able to click on an icon to access any of the mail systems, which will include systems from Apple, Novell, Inc. and Microsoft Corp. as well as X.400 and fax support, without having to have a separate log-on and directory services for each mail transport.

"Users will have a single log-on password through which all system services will be addressed," Sidhu said.

Personal directories

In addition to the universal mailbox, Apple will allow users to create individual catalogs, otherwise known as directories, that contain specific types of documents and data. These directories can then be accessed using icons and a series of templates that Apple will provide.

Apple will also add a mailing label to all documents to make it easier to send documents, and any document sent through the system will be automatically encrypted.

On the server side, the Apple strategy calls for deploying two PowerShare servers, one of which handles E-mail; the other is described as a catalog server. This latter server will support replication across distributed servers, will include indexes to make it easy to find documents in catalogs and will support multilanguage translations of documents, time synchronization and RSA security.

Initial reactions to the Apple strategy have generally been very positive.

"What Apple is doing is excellent. I always thought the Macintosh was a real computer," said Michael Young, a consultant at Computer Sciences Corp. who is working on projects at Brooks Air Force Base in Texas.

According to Young, Windows is currently the dominant platform at Brooks, but he expects the new capabilities in System 7 will get some units to shift to the Macintosh.

Notes leads, but flaws cited

CONTINUED FROM PAGE 1

Currently, Notes has a list price of $495 and a street price of about $280. Resellers note that when you add the cost of Notes to the cost of an application built on top of it, along with the installation and ramp-up costs, the total cost of a Notes installation can be prohibitive.

Lotus contends that Notes is currently priced to compete with other PC applications and databases.

But analysts and users said this strategy is misguided.

"Lotus is applying a PC model to an IS issue. They are a desktop vendor moving up the curve into a territory that used to be dominated by IBM. As such, they are still experimenting with the pricing and channels," said Dave Marshak, an industry analyst at the Patricia Seybold Office Computing Group in Boston.

Lotus, meanwhile, hopes to resolve some of the Notes integration issues by pressuring IBM to support Microsoft Corp.'s Object Linking and Embedding (OLE) API, said Lotus Chief Technology Officer John Landry. "We want IBM to support OLE and the Windows API to minimize the impact of supporting OS/2. Right now it's a hard port," he said.

As for integrating with Unix applications, Ray Ozzie, president of Iris Associates, a Westford, Mass., engineering firm that builds Notes for Lotus, said that while Unix has some OLE-like facilities, the differences in those facilities make it difficult to integrate Windows applications with Unix applications.

Suite sailing

Lotus this fall will update 1-2-3 Release 4 with support for the Application Field Exchange facility used to integrate applications in its office suite with its Notes environment. Using OLE Version 1.0 to tie 1-2-3 Release 4 with its office suite will give Lotus a short-term advantage over rival Microsoft. That advantage is likely to be overturned when Microsoft releases Office Version 4.0 at year's end, which is expected to include a suite of applications that support OLE Version 2.0. Lotus, meanwhile, is expected to support OLE 2.0 sometime next year.

Rivalry heats up

Many observers gave Lotus an 18-month lead over its nearest competitor, Microsoft, mostly because Microsoft's groupware strategy relies heavily on undelivered products.

Among the key compoocents of Microsoft's groupware strategy are a document-centric implementation of Windows 4.0; an electronic-mail server based on an object database running on Windows NT (see story page 15); and replication services that will be included in its E-mail systems, file systems and SQL databases.

Lotus has already implemented a document-centric architecture that can be used to incorporate PC applications inside Notes discussion databases complete with bidirectional replication in the Notes databases. But users and resellers said Lotus is missing an opportunity to tock up the market before Microsoft can get started.

To fend off Microsoft, Lotus must focus on providing more robust development tools for Notes in short order. Most of the Notes applications are relatively simple applications tied to discussion databases. Lotus is expected to resolve this problem through alliances with third-party tool developers and the creation of a graphical user interface development tool, dubbed Notebook, expected later this year.

On record

In the Computerworld Firing Line in the July 12 issue, Cliff Conniglion, director of marketing for Notes, addressed the pricing concerns of the surveyed evaluators, who claimed $495 for a single license was higher than the price of other Windows applications.

"$495 is a good and fair price for a software product that has demonstrated a 400% customer return on investment," he said.

Objects pitched to simplify E-mail management

By Michael Vizard
SAN JOSE, CALIF

Microsoft Corp. and Lotus Development Corp. are getting their respective houses in order as they move to client/server electronic-mail systems that will rely heavily on object technology.

The basic idea behind the object-oriented systems is to simplify administration headaches that have long been the bane of information systems directors coping with different E-mail protocols.

Meanwhile, some users said they are losing patience with the dogfight between the Vendor Independent Messaging (VIM) coalition led by Lotus and Microsoft's Mail Application Programming Interface (MAPI) standards, and are taking different tacks to solve the problem.

"The vendors should be locked in a room until they come to an agreement," said Art Beckman, manager of information technology services at Pacific Gas & Electric Co. (PG&E) in San Francisco. "Without an agreement, the users are taking it in the shorts and the vendors are losing revenue."

Until some accord is reached, however, the vendors are going their separate ways. According to industry sources, Microsoft is expected to deliver its promised Electronic Messaging Server (EMS) in the second quarter of next year. This server offering, which will run on top of Microsoft's Windows NT, will use an object database to tie any MAPI-compliant front-end mail system into EMS.

Self-service

Some IS shops are taking object-oriented E-mail into their own hands. Waste Management of North America in Lombard, Ill., is building an object database on top of an E-mail gateway from Soft-Switch, Inc. in Wayne, Pa.

The goal is to use object technology to make it easier to add users to a heterogeneous network of E-mail systems. Simply pointing and clicking on an object will update a directory service that is shared by MAPI-compliant front-end mail systems.

Meanwhile, Lotus is continuing to pursue a course that calls for the integration of CC:Mail and Notes Mail under a common transport. Under this evolving strategy, Lotus plans to use Notes Mail, which has a client/server architecture, as the primary back-end service, while giving users a choice of CC:Mail, Notes Mail or other VIM-compliant front ends.

Ultimately, Lotus will build an object database on top of the Notes Mail services, said Jane Eisenberg, senior product marketing manager at Lotus.

Trend toward object-oriented

In the meantime, vendors are advising customers and other developers to write to the object-oriented versions of their respective application programming interfaces to prepare for the future.

Managing multiple E-mail systems remains problematic. Beckman said his company requires all mail services to be compatible with the directory services in the Vines network operating system from Banyan Systems, Inc. However, if there was a common mail transport, he might open PG&E to other mail products.

For similar reasons, Price Waterhouse decided to replace CC:Mail with Notes Mail when it moved to Notes, and American Airlines has decided to deploy WordPerfect Office 4.0 rather than wrestle with multiple E-mail systems.

According to Terrel Jones, president of American's Sabre Computer Services, WordPerfect Office will be deployed on multiple platforms in place of 6,000 HP Desk licenses, 3,000 IBM Professional Office System licenses, 4,000 Microsoft Mail licenses, 500 CC:Mail licenses and 200 VMSmail licenses.

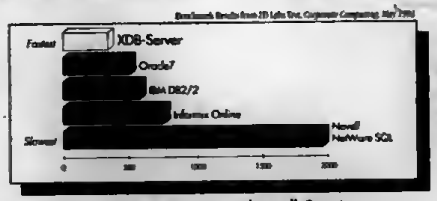
But while these IS directors apparently have the clout to enforce standards at their own companies, most IS shops are expected to wrestle with multiple E-mail systems far into the future and will likely have to wait for the next generation of object-based E-mail systems to resolve the administration issues.

FREE TUNING GUIDE!

Count On XDB For Your Client/Server Database Solution.

1 Performance

When *Corporate Computing* reported the results of a recent ZD Labs benchmark study, they raved: "XDB-Server amazed us. It virtually lapped the competition...." XDB ran over 30% faster overall than either Oracle7 or DB2/2. And, for complex queries, the difference soared to 80%! When it comes to performance benchmarks, XDB beats every contender hands down.



Time in Minutes to Complete All Queries

2 Compatibility

XDB supports 100% of the features you value in DB2 — Oracle7 doesn't, and neither does DB2/2. XDB lets you downsize to client/server and keeps your data consistent across platforms. XDB has long been the standard for DB2 development on the workstation. Now in our latest version...XDB provides a powerful production client/server RDBMS solution to make your server really run like a mainframe.

DB2	XDB	ORACLE7	DB2/2
DB2 System Catalog Tables	YES	NO	NO
DB2 Storage Architecture	YES	NO	NO
DB2 Distributed Access Using 3-Part Names and ALIAS	YES	NO	NO
Cascading Referential Integrity	YES	YES	NO
Read-only Shared Databases	YES	NO	NO

3 Connectivity

XDB provides the open architecture you need to connect your enterprise — working for you on DOS, Windows, Windows NT, and OS/2. Only XDB provides a DRDA gateway to IBM mainframe databases with full three-part name support. With XDB's ODBC support, you now have the freedom to choose the front-end tool best suited to your development needs.

In a client/server environment, you need a client/server database solution that delivers top-level performance. You need a good fit. And, you need to be able to work with existing data. Two out of three isn't good enough for your mission-critical systems. XDB Systems is the *only* company with a client/server RDBMS solution that you can count on to deliver all three.

XDB Systems gives you the performance, compatibility, and connectivity you need.

XDB

Call today: 1-800-488-4948, ext. 552

© 1993, XDB Systems, Inc. XDB is a registered trademark of XDB Systems, Inc. Other product names are trademarks or registered trademarks of their respective holders.

News Shorts

LAN meets WAN in switch

LightStream Corp., a joint venture between Bolt Beranek and Newman, Inc. and Ungermann-Bass, Inc., last week unveiled what analysts said is the first integrated local- and wide-area network backbone Asynchronous Transfer Mode (ATM) switch to reside in a single box. The switch, with throughputs of up to 2G byte/sec., is due late next month.

CSC wins software deal at Rockwell

Rockwell International Corp. has awarded a $3.6 million contract to **Computer Sciences Corp.** to install a common Unix-based ordering and logistics system across Rockwell divisions. Rockwell uses a variety of inconsistent mainframe-based parts-numbering and tracking systems.

Third-party tools arrive for Borland

Users of **Borland International, Inc.**'s InterBase database no longer have to rely on Borland for compatible development tools. New York-based **Jyacc, Inc.** announced last week JAM/Database Interface for InterBase, a tool set that runs under Windows and DOS. The product was designed to let users build PC applications that can access data on Unix or VMS servers running InterBase Version 3.3 or higher. A DOS version costs $990; a Windows edition sells for $1,780.

Management software is upgraded

Cabletron Systems, Inc. has announced Version 2.0 of Spectrum, its enterprise network management platform. Included is a feature that allows users to export management data from the Spectrum database so SQL environments and spreadsheet applications such as Lotus Development Corp.'s 1-2-3 can use the data in graphs and reports. The company also announced Spectrum for Open Systems, which is said to enable leading Simple Network Management Protocol-based management platforms such as Hewlett-Packard Co.'s OpenView and Novell, Inc.'s NetWare Management System to manage Cabletron hubs.

Cisco profits soar for Q4, year

Internetworking vendor **Cisco Systems, Inc.** last week posted fourth-quarter net profits of $53.7 million, a 97% increase over the corresponding period last year. Revenue in the period ended July 25 rose 85% to $205.2 million. For the year, Cisco earned $171.9 million on sales of $649 million, increases of 104% and 91%, respectively.

Unisys, disk drive maker settle lawsuit

Unisys Corp. has settled its copyright infringement lawsuit against **Macro Computer Products, Inc.**, a Rochester Hills, Mich.-based computer disk drive manufacturer and reseller of used Unisys equipment. Under terms of the settlement, Macro has agreed not to use counterfeit Unisys parts, to license all software for Unisys computers it uses and to return or destroy all proprietary Unisys information and software in its possession. Additionally, Macro made an undisclosed payment to Unisys.

SHORT TAKES **Mobius Computer Corp.** said last week it started shipping three clones of **Sun Microsystems, Inc.** SPARCstation 10 machines, priced from $8,985 to $10,985. . . . **NCR Corp.** this week will throw its hat into the ring of aspiring ATM vendors. The company's forthcoming ATM products will focus on optimizing local- and wide-area bandwidth for data, video and voice transmissions at speeds reaching 3.2G byte/sec. . . . **IBM** is suing **Conner Peripherals, Inc.** for infringement of nine IBM magnetic disk storage patents.

Peer LANs target big business

Vendors push reliability, administrative features to woo wary IS

By Elisabeth Horwitt

IBM, Novell, Inc. and Microsoft Corp. are all expected this fall to launch peer network operating system products aimed at the corporate market. Their intent is to beef up what have traditionally been low-end, small company local-area network systems with enough reliability, power and administrative features to attract wary corporate information systems managers.

It could be a hard sell. "Most corporations are scared to death of peer-to-peer systems," said Jamie Lewis, president of The Burton Group, a consulting firm in Salt Lake City. "It's anarchy, with every user his own network administrator."

Peer network operating systems such as Artisoft, Inc.'s LANtastic, Novell's NetWare Lite and Microsoft's Windows for Workgroups enable desktop systems on a LAN to share files, printers and applications directly, without the formality of going through a server.

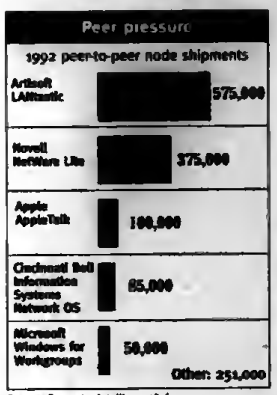
Positives and negatives

Such systems are said to be less expensive and easier to implement. However, the absence of a server also makes it harder to ensure consistency across duplicate data sets and to administer user access rights, vendors and analysts agreed.

A recent IBM market survey found that "the value of a peer-level connection is high at two users and almost gone at seven to eight users," said Art Olbert, IBM's Personal Systems director. After that, he said, IBM customers reported "they had to introduce a server, [or else] keeping track of access rights, passwords and files gets out of hand."

Announcements this fall will attempt to win corporate hearts by providing a hybrid system that can connect with equal ease to other peer systems and to a popular server such as Novell's NetWare (see story below).

Hybrid products also provide workgroups with an easy migration path from peer to client/server environments as their numbers grow, according to vendors.



Source: Computer Intelligence/Infocorp, Santa Clara, Calif.

There could be a corporate niche for such hybrids, analysts said. "I think the old NetWare 2.X market of 45 to 99 users is where the more robust peer network products will fight it out," said Stan Schatt, director of LAN services at Computer Intelligence/Infocorp in Santa Clara, Calif.

One potential corporate niche for peer software is as an add-on system that makes it much easier to network the average desktop workstation, Lewis said. Windows for Workgroups, for example, is "network-ready, with electronic mail and scheduling included," just like a Macintosh, he said. "It took me five minutes to install the Mac on NetWare and all day to install Windows."

High hurdle

However, vendors will first have to combat some well-entrenched preconceptions of peer networking as a product for tiny companies.

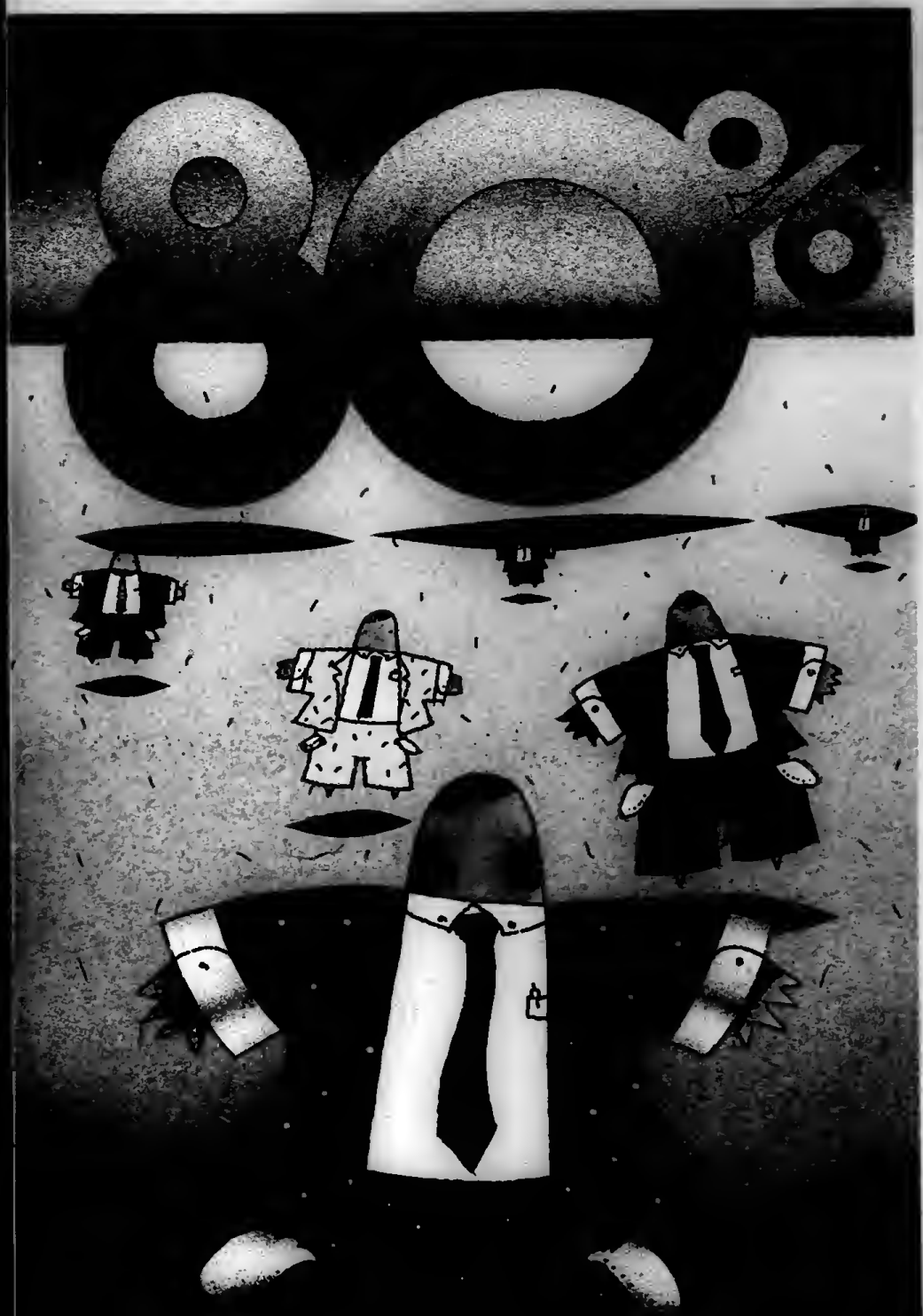
"I'm not taking NetWare Lite seriously; it's redundant when you have full NetWare," said Glenn Fund, president of the Boston Area Novell User Group who is in charge of networks for a large New England defense contractor. NetWare v3.11 is no more complex to set up than NetWare Lite, Fund said. "The complexity comes from having to assign lots of rights to lots of users."

Even value-added resellers (VAR) seem to steer clear of recommending such systems.

Kim Reggio, a network administrator at Bay State Gas Co., suggested to one VAR that NetWare Lite would work well for the New England Gas Association, "which has a small office." The consultant countered by recommending a 10-user version of "full-blown NetWare."

In addition, when Microsoft ships its Mail Application Programming Interface (MAPI), Windows for Workgroups will potentially tie any application to any E-mail system supported by MAPI, Lewis said.

IF YOU'RE RUNNING CICS ON A MAINFRAME, YOU'RE MISSING OUT ON AN 80% SAVINGS.



The Encore Infinity 90™ easily runs all your existing CICS COBOL VSAM programs with operational savings up to 80% over your current mainframe installation.

And it does it on your existing 3270 network with a consistent and unchanged interface for your users. It is transparent to your COBOL application programmers and offers massive scalability and I/O throughput to consolidate the workload of several mainframes on a single, open system. Migration of your CICS applications to an Infinity 90 with Integris' UniKix is painless, incremental and dramatically cost-effective. And you won't have to worry about re-engineering costs, retraining costs or interoperability with your CICS applications. Integral to Infinity 90 is a full range of system management software, including tuning, administration, monitoring and security all built with user-friendly, contemporary graphical interfaces. Call us and we'll quantify these savings and performance increases. Scale the future with ease. Call Encore today.

ENCORE
COMPUTER CORPORATION

DELIVERING ENTERPRISE SOLUTIONS

Encore Computer Corporation
6901 W. Sunrise Blvd.
Ft. Lauderdale, Florida 33313-4499
(800) 933-6267 U.S. and Canada
(305) 587-2900 Worldwide

™Infinity 90 is a trademark of Encore Computer Corporation.

intel inside

Beaverton, Oregon, Boasts Two World Leaders.

Welcome to Beaverton.

Where you'll find the headquarters of the world leader in athletic footwear. As well as the headquarters of another, slightly less well known world leader: Sequent® Computer Systems.

Sequent leads the computer industry in mid-to-high end open computing systems. A fact recently confirmed by both IDC and Infocorp.

Sequent's credentials include thousands of systems installed worldwide. The first commercial symmetrical multiprocessing servers. And new servers specifically designed for Microsoft's Windows NT™ operating system.

In short, we know our technology.

But just as important, we know the real world. We know our customers use our systems for mission-critical business applications. And we know, from experience, that complicated, open, multivendor installations are the norm – with complex interdependencies between hardware and software.

That's why everyone at Sequent is 100% committed to the complete success of every installation, and empowered to deliver it. Not just for our own hardware, but for everything in the system, hardware and software, no matter who the vendor may be.

It's not a promise made lightly. But it sure is one that befits a world leader.

To find out more, call us at 1-800-854-0428.

SEQUENT

Our Business Is Your Success

© 1993 Sequent Computer Systems, Inc. Sequent is a registered trademark and "Our Business Is Your Success" is a trademark of Sequent Computer Systems, Inc. Microsoft is a registered trademark and Windows NT is a trademark of Microsoft Corporation. The Intel Inside logo is a registered trademark of Intel Corporation.

Unisys restructures as president exits

By Thomas Hoffman
BLUE BELL, PA

Unisys Corp. last week consolidated five units into three, in an attempt to increase revenue as opposed to simply cutting costs.

At the same time, company President and Chief Operating Officer Reto Braun departed.

With seven consecutive profitable quarters behind it, Unisys has entered what Chairman and Chief Executive Officer James A. Unruh defined as "Phase II" of its restructuring. The $8.4 billion company's three major divisions now include Information Services and Systems — which Unruh will oversee — Government Systems and Computer Systems.

By flattening its organization, Unisys eliminated the need for Braun, a 24-year company veteran.

Analysts and company insiders said they were not surprised by Braun's departure because he had been pining to run his own outfit for years. "Plus, it reflects how companies are restructuring these days, from the top down instead of from the bottom up," said Barry F. Bosak, a financial analyst at Smith Barney Shearson, Inc. in New York.

Braun promptly landed a top spot as chief executive and president at Moore Corp., a $2.4 billion business forms producer in Toronto.

Most analysts, including Bosak, were unenthused by the restructuring, given the spate of reorganizations sweeping the industry.

Deja vu

And Unisys has restructured before. But despite nearly two years of consistent profitability, the company's revenue growth has remained flat. To help pump life into its stagnant sales, the company last week also created two integrated business units that will focus on information services and client/server systems.

Unruh said the changes at Unisys should be viewed as attempts by the firm to enhance "profitable" revenue growth. Many analysts had blamed Unruh's predecessor, W. Michael Blumenthal, for seeking revenue growth at the expense of long-term stability, which nearly drove the firm to bankruptcy by 1990.

Unruh is continuing to reposition Unisys as less of an equipment company and more of a services and technology solutions provider for the four primary markets the company serves: financial services, airlines, telecommunications and the public sector.

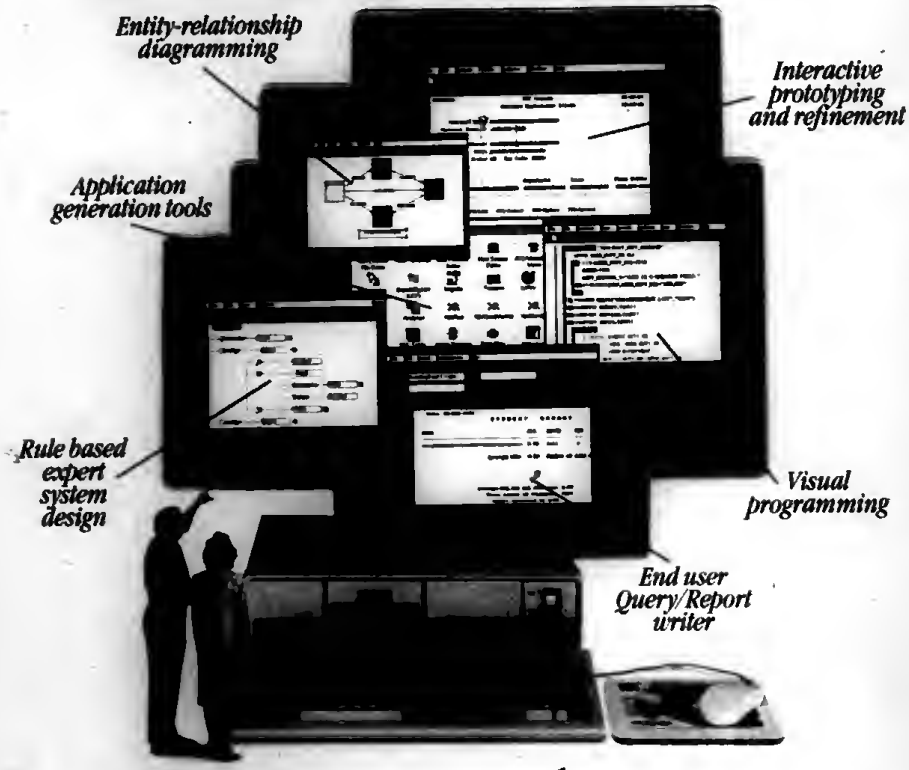
Most users said they would give the new organization time to settle in before evaluating its performance. Still, several Unisys customers said they hoped the restructuring would result in improved support and training.

"I've had some ups and downs with customer service," noted Rick Zizak, an information systems manager at The Millcraft Paper Co. in Cleveland. Millcraft, which purchased a Unisys U6000/35 Unix machine last year, has since experienced trouble getting answers to technical questions from Unisys representatives. Zizak said he believes strong demand for the Unix machines has stretched the vendor's slender support staff even thinner.

"I had found that I did not get the Unix support that I got from the A series [mainframe] support team. They need to get more people over on that side of the fence," Zizak said.

Maintaining proper staffing levels among business units will be just one of the new challenges facing Al Robbins, whom Unruh last week named as vice president of organizational change and development. Robbins, who hails from the company's human resources department with a Ph.D. in organization development from Stanford University, will also be charged with addressing corporate training and enacting cultural change during the transformation.

"Wow, that's what I call pushing the boundaries..."



Cincom's AD/Advantage Application Generation System

AD/Advantage generates client/server applications thousands of times faster than programmers can write them. And with our new AD/Advantage for Windows, you'll push the boundaries of speed and productivity. Fully-portable applications can be developed and/or deployed on IBM MVS, VSE (CICS and IMS/DC) and VM; most UNIX systems; Digital OpenVMS and OSF/1; DOS and OS/2. And AD/Advantage supports strategic data bases including SUPRA, DB2, SQL/DS, DL/I, Rdb, Oracle and others.

To find out more about AD/Advantage and to receive a free poster call 1-800-543-3010.

CINCOM'S APPLICATION GENERATOR

CINCOM
The Smart Choice™

MICROSOFT WINDOWS COMPATIBLE

© 1993 Cincom Systems, Inc. The following are registered trademarks of Cincom Systems Inc: CINCOM, SUPRA, AD/Advantage and The Smart Choice. All trade names referenced are the trademark or registered trademark of the respective manufacturer

High performance 486™DX2. Blazing 66MHz, backed by our exclusive turbo cache, for unparalleled workstation performance.

Two Full-length ISA Slots. Connections are everything. And this machine allows for plenty—Ethernet, video, you name it.

Optional Built-in 5.25" CD-ROM. The medium with capacity for video clips, graphics, photo CDs, or an entire set of manuals.

PCMCIA Expandability. The T6600C offers a huge wealth of communication and expansion options, including a 16mm PCMCIA 2.01 compliant slot large enough for a hard drive!

Built-in Stereo Speakers. Quality audio adds another dimension to any program. With Microsoft® Microphone™ included, your work can speak for itself.

A technological tour de force that actually tours.

Take your entire show on the road. The new Toshiba T6600C Series represents the most advanced technology and muscle we've ever put into a portable. With its 486™DX2 processor, dual ISA full-slot expansion, and huge storage options, the T6600C Series delivers the power and capacity for the most demanding portable applications. From network analysis to software development to full-blown multimedia, if you need to tour with a great deal of force, this is your system.

Feel the force. **For your nearest dealer, call 1-800 457-7777.**

- Intel 486™DX2/66MHz
- 8MB RAM expandable to 40MB RAM
- 10.4" color active matrix TFT-LCD screen
- SVGA display with 640x480x256 color resolution
- 510MB HDD
- Two full length 16-bit ISA slots
- One 16mm PCMCIA 2.01 compliant slot
- Built-in SCSI with external SCSI-II port
- Microsoft® Sound System™
- 5.25" half height 200ms double speed CD-ROM (T6600C/CD and T6600C/CDV models only)
- MediaShare®Mambo™ DVI®/Ethernet™ board (T6600C/CDV model only)

intel inside

In Touch with Tomorrow

TOSHIBA

© 1993 Toshiba America Information Systems, Inc. The Intel Inside logo is a trademark of Intel Corporation. All products indicated by trademark symbols are trademarked and/or registered by their respective companies. ISIS is a registered trademark.

TICK

THIS MOMENT IN THE LIFE OF AN IT MANAGER IS ABOUT

TO BE SOLVED BY SOLARIS, THE OPERATING

ENVIRONMENT THAT CONNECTS THE ENTIRE ENTERPRISE.

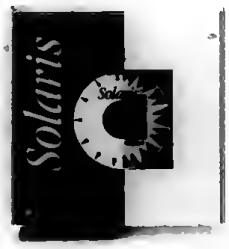
THERE ARE TIMES WHEN YOU'RE SURE THE WHOLE ENTERPRISE WILL NEVER GET RIGHTSIZED. HELP IS HERE.

IT'S SOLARIS.

IT'S FROM SUNSOFT AND NOW AVAILABLE FOR x86 AS WELL AS SPARC® — THE MOST POPULAR CISC AND RISC ARCHITECTURES. WITH THE SOLARIS® SOFTWARE OPERATING ENVIRONMENT YOU'LL CONNECT YOUR ENTIRE ENTERPRISE — HARDWARE AND SOFTWARE — AND RUN IT LIKE ONE WELL-OILED MACHINE.

SOLARIS IS THE RIGHT 32-BIT SOLUTION FOR A WORLD WHERE MANAGEMENT EXPECTS YOU TO DO MORE WITH LESS, TO MAXIMIZE THE RESOURCES AT YOUR DISPOSAL, TO PROTECT YOUR EXISTING HARDWARE AND SOFTWARE INVESTMENTS, AND PROVIDE EVEN MORE POWER, PRODUCTIVITY AND FASTER TIME TO MARKET. SOLARIS GIVES YOU VIRTUALLY UNLIMITED ACCESS TO ALL SYSTEMS ON YOUR LANS AND WAN*. WHAT'S MORE, IT'S SCALABLE FROM PCS TO MAINFRAMES.

SOLARIS HARNESSES AND CIVILIZES THE POWER OF UNIX®, THE PROVEN STABLE ENVIRONMENT AND LEADING 32-BIT DISTRIBUTED COMPUTING SOLUTION. UNIX IS RENOWNED FOR HIGH PERFORMANCE MULTITASKING, MULTITHREADING, AND MULTIUSER CAPABILITIES. AND SOLARIS RUNS MORE 32-BIT APPLICATIONS THAN ANY OTHER OPERATING ENVIRONMENT — OVER 7,500 INCLUDING LEADERS LIKE COMPUTER ASSOCIATES, ORACLE AND LOTUS. SOLARIS RUNS WINDOWS AND DOS, TOO. YOU'LL ALSO DISCOVER AN EXCELLENT SOFTWARE DEVELOPER ENVIRONMENT AND A SEAMLESS TRANSITION TO DISTRIBUTED OBJECT COMPUTING.



IF ALL THIS SOUNDS LIKE THE SOLUTION YOU'RE LOOKING FOR, DON'T WASTE ANOTHER SECOND.
CALL 1-800-227-9227.

SunSoft

THE NETWORK IS THE COMPUTER™

©1993 Sun Microsystems, Inc. Sun Microsystems, SunSoft, the SunSoft logo, the SunSoft tagline and Solaris are trademarks or registered trademarks of Sun Microsystems, Inc.
SPARC is a registered trademark of SPARC International, Inc. UNIX is a registered trademark of UNIX System Laboratories, Inc.
All other registered trademarks are the property of their respective companies.
*Third-party software may be required.

TOCK

Viacom CIO climbs corporate ladder

By Allan E. Alter
NEW YORK

Viacom International, Inc., the $1.9 billion media company that owns the MTV, Nickelodeon and Showtime networks, last week elevated its CIO to the upper echelon of the corporation.

Henry J. Leingang, who has held the title of chief information officer since joining Viacom in 1990, has been promoted from vice president to senior vice president. He continues to report to Frank J. Biondi Jr., Viacom's president and chief executive officer.

"The promotion elevates me to peer level with other functional executives in the company," such as the chief financial officer or the head of the legal department, Leingang said.

Leingang's ascension reflects the changing nature of the mass-media business. Having an astute technologist involved in business strategies is critical, given how quickly the entertainment, computer and communications industries are converging. The promise of multimedia and interactive TV presents new business opportunities, which could go untapped without a clear understanding of information technology.

No longer back-office

The promotion also reflects the elevation of the role of the information systems organization at Viacom from a back-office function to "an enabler of operating strategies," Leingang said. "The information systems and technical function is becoming more important to the company. With the trends going on in our industry — regulation, [corporate] alliances, competition and technology — we need good information systems and a good technology infrastructure so we can respond quickly to changes in the marketplace," Leingang said.

Investing within

Viacom has expanded the IS organization and increased its information technology investments

1990	60	400
1992	110	1,700
1993	130	2,500+

After joining Viacom in 1990 as its first CIO, Leingang led a major overhaul of Viacom's information technology infrastructure while simultaneously decentralizing and expanding the IS function. The company has moved from a centralized IBM mainframe environment, running MVS on an IBM 3084, to one that uses 10 IBM Application System/400s as servers for more than 2,000 PCs.

Four of Viacom's major business units, as well as its New York headquarters, are each served by their own IS organization; the vice presidents of these IS organizations report to both Leingang and the CEO of their business unit.

With the restructuring effort behind him and a wide-area network in place, Leingang is focusing on improving service to the cable operators and advertisers that make up much of Viacom's customer base and enabling and promoting cooperation between Viacom's business units.

"As the [information technology] infrastructure grows, it supports the way things flow between groups, as opposed to supporting specific functions within the company," Leingang said.

He declined to discuss specific applications but said he expects to see the creation of tools that would help advertisers select advertising spots and coordinate advertising across Viacom cable TV networks.

In the more distant future, the network may be the means by which work flows between producers of TV programs and the distributors who deliver such programs to viewers. For example, *Roseanne* could be transmitted over the network, or a producer could send a video clip to a network executive as an attachment to an electronic-mail message, Leingang said.

YOU'RE LOOKING AT THE ANSWER TO YOUR COMPANY'S NETWORK OUTSOURCING NEEDS.

Actually, you won't find the answer on this piece of paper. At least not yet. And that's exactly the point.

Your business is different from everyone else's. Your networking needs are unique. So why is it so many companies already have a pre-packaged, one-size solution to your networking problems, even before they've asked you a question?

At Advantis,™ we believe the only real answer is to start with a blank sheet of paper. We'll sit down with you and discuss your specific requirements. Then we'll recommend a solution that's designed for *your* company.

No one is more capable of handling your networking needs, because networking is our only business. Our Custom Network Solutions provide the foundation for all, or part, of your data, voice and video network requirements from re-engineering through implementation and management. We also offer many other value-added outsourcing opportunities including a full range of remote computing and messaging services.

So if you're tired of pat answers or blank stares, let us start with a blank sheet of paper. Call the networking experts at Advantis: 1-800-775-5808 or send an electronic message to USAVTADV at IBMMAIL™ today.

advantis™
A NETWORKING TECHNOLOGY COMPANY

© 1993 Advantis. All rights reserved. TM Advantis is a trademark of Advantis.
TM IBMMAIL is a trademark of International Business Machines Corp.

JUST HOW STRONG IS YOUR INFORMATION CHAIN ?

© 1993 AT&T

The weak link could be your data transmission. That's why so many businesses rely on AT&T ACCUNET® digital services.

You've got the best computers. The most sophisticated software. And backups upon backups. But if your data lines don't have the *same* level of reliability, your information can end up missing in action.

AT&T ACCUNET services have the reliability you expect from AT&T. Because only AT&T has FASTAR,℠ an exclusive "self-healing" technology that immediately identifies cable cuts and automatically reroutes data around trouble spots. Restoring service in minutes, instead of hours.

But FASTAR is only *part* of the AT&T reliability story—there are many other chapters. The bottom line: no matter what your reliability needs, our experienced sales force can help determine the required reliability levels for *your* applications.

You don't have time for downtime. You need AT&T ACCUNET private line digital services, designed with the latest technology to help give you maximum network "uptime." For more information about both domestic and international connections, call your AT&T Account Executive or 1 800 248-3632.

AT&T. The Best in the Business.™

AT&T

IBM Client/Server

IBM is a registered trademark of International Business Machines. © 1993 IBM Corp

How do you get everyone working in concert?

To stay competitive, you're constantly searching for better ways to orchestrate the flow of information. How do you get more out of your PCs? How can you make the most of your existing systems? What can be done to streamline your organization? More often than not, the answer is IBM Client/Server.

IBM can develop open client/server solutions that put the combined strength of all

your computer systems to work for you. We have thousands of specialists worldwide who can work with you to custom-tailor a solution that's right for your particular business. And we'll work with you at any stage of the process, from initial consulting to helping you tie everything together—we'll even manage your systems for you.

Whether you're upsizing or downsizing, nobody knows how to ensure systems reliability and security for your "mission critical" applications better than IBM.

We can also help you integrate different types of hardware, software and networks. We have the industry's widest array of software and network products, and we support Distributed Computing Environment (DCE), enabling different computer brands and platforms to work together in harmony.

For more and more companies, IBM Client/Server is the key to getting everyone working in concert. We've done it for hundreds of companies. We can do it for you. For more information, call 1 800 IBM-0045, ext. 10.

There's never been a better time to do business with IBM®

Bombs go away

By Ellis Booker

Last month was the 48th anniversary of Trinity, the first nuclear bomb test, conducted on July 16, 1945.

But a great deal has changed since that day just before dawn in the desert in Alamogordo, N.M.

For one thing, the end of the Cold War and a recent U.S. commitment to suspend underground nuclear tests (at least through September 1994) has prompted the makers of mass destruction weapons to turn to alternative ways of testing.

Enter a variety of planned projects to simulate nuclear blast tests. (The U.S. conducted its last underground nuclear test in September 1992.)

However, bomb designers are not all that confident that computer models alone are sufficient.

"By and large my feeling is these computer simulations are vastly overrated," said Steve White, a technical staff member at Los Alamos National Laboratory in New Mexico.

White, who has 10 years of experience in weapons research, said the trouble lies in nuclear physics and the equations used to understand it.

"As far as our fundamental understanding of the physics, we're at mesh resolutions that are two to three orders of magnitude too large," he said. In other words, calculations of these complicated equations are still not detailed enough to predict outcomes.

White said even when aided by the most sophisticated computers — Los Alamos uses both Cray Research, Inc. supercomputers and Thinking Machines Corp. massively parallel processor systems — scientists still must "evolve" the computer code to make the results match the observed reality.

Nevertheless, bomb-simulation efforts are going forward. Along with computer models, planned Pentagon projects call for the construction of specialized centers for simulating aspects of bomb blasts such as X-ray radiation and heat using non-nuclear materials.

Proponents of simulations said these systems will accurately gauge the bombs' explosive potential and their impact on different targets and answer questions about the shelf life of warheads.

Thought impersonators

Program applies humanlike reasoning power to draw analogies

"A native talent for perceiving analogies is ... the leading fact in genius of every order."
— Psychologist William James, 1890

By Mitch Betts

When we read about a new episode of official misdeeds, shredding documents and lying to Congress, we immediately call that a "cover-up" or "another Watergate." We may even give it a name ending in gate, such as Contragate.

This subconscious ability to draw an analogy — a resemblance between something we know and something new — has intrigued researchers who want to give computers humanlike intelligence.

In a new book, *Analogy-Making as Perception* from MIT Press, researcher Melanie Mitchell describes a computer model called Copycat that attempts to mimic humans' analogy-making ability, albeit in the limited domain of the English alphabet.

Copycat is an intelligent program that constructs analogies by matching patterns it sees in a string of letters (see box).

And how does Copycat compare with human efforts to solve letter-string analogy problems? The computer program matches two-thirds of the answers that are commonly given by three or more people, according to Mitchell, who is an assistant professor at the University of Michigan.

ANALOGY PROBLEMS

PROBLEM 1
abc → abd
ijk → ?
Humans and the Copycat computer program typically answer: ijl. The rightmost letter is replaced by its successor.

PROBLEM 2
abc → abd
ijkk → ?
Humans and Copycat typically answer: ijll. The rightmost group is replaced by the successor group.

PROBLEM 3
abc → abd
xyz → ?
Most humans answer xya, which assumes the alphabet is circular. Copycat is not programmed with that assumption, so it fails to arrive at that answer. Another creative answer is wya, which treats xyz as the mirror image of abc and then replaces the leftmost letter with its predecessor.

The program's biggest shortcoming is that when it hits a brick wall, it keeps banging its head. For example, when it tries to find the successor to *z* in Problem No. 3 above, it goes into a state of "mindlessly loopish behavior" because its program does not allow for a successor to *z*, she said.

Copycat tries again and again (nine times in a row) to find the successor to *z*, whereas a human would give up after two or three failures, Mitchell wrote.

Not quite human

The fundamental problem is that Copycat lacks the human trait of "self-awareness," or monitoring its own processes, according to Douglas R. Hofstadter, the intellectual godfather of Copycat and director of the Center for Research on Concepts and Cognition at Indiana University.

"Humans do not get caught in obvious loops; they quickly perceive the pointlessness of loopy behavior and jump out of the system," he wrote in the book's afterword.

Giving a computer such self-awareness would bring it closer to having humanlike consciousness and even creativity, Hofstadter said, because creativity requires the ability to "avoid falling into mindless ruts."

Hofstadter said he hopes Copycat can evolve into a more creative program, dubbed Metacat, that would have a better sense of what it is doing, perhaps even "engage in banter of sorts with a human about the merits and demerits of a given solution."

Ideally, he said, Metacat would also be able to store its past experiences in episodic memory to help it tackle new problems, see analogies between analogies and move beyond solving puzzles to making up new ones.

Hofstadter said research at Indiana University is moving toward that long-term goal, but he acknowledged that "these wildly ambitious ideas are unlikely to ever be realized in full."

Tech Talk

Auto safety

A Swedish professor whose daughter was killed by a drunk driver has developed an electronic card-car computer system that would allow only authorized persons to operate cars.

Unveiled earlier this month, the proposed system would ban drunk drivers from the road by invalidating their electronic cards. The system could also reduce car theft, said Swedish officials who funded the work.

On another front, two months ago, Toyota Motor Corp. announced a prototype "advanced safety vehicle" featuring computer-based systems for preventing collisions.

The safety devices, which the Japanese carmaker said might be built into future commercial car models, include a system that automatically dims or reorients headlights to avoid blinding oncoming traffic; a wristband that monitors a driver's heart rate and stops the car if he dozes off; an alarm that sounds when the car comes too close to a vehicle ahead (and will even put on the brakes if the driver fails to take action); and a flight recorder-type system for recording events just before a crash.

Car content rules

Meanwhile, U.S. automakers race to develop tools to help their 10,000 suppliers comply with vehicle content reporting rules to be imposed under the North American Free Trade Agreement. Earlier this month, a task force from Chrysler Corp., Ford Motor Co. and General Motors Corp. was established under the auspices of the Automotive Industry Action Group (AIAG). The group was charged with developing a common content reporting format; the AIAG has also developed an electronic data interchange transaction set for content information.

High performance.

The drive to succeed.

What drives your business forward? Meeting your marketing objectives? Increasing your competitive edge? Delivering innovative products? It's probably all of these and more. And that's where SAP software can help.

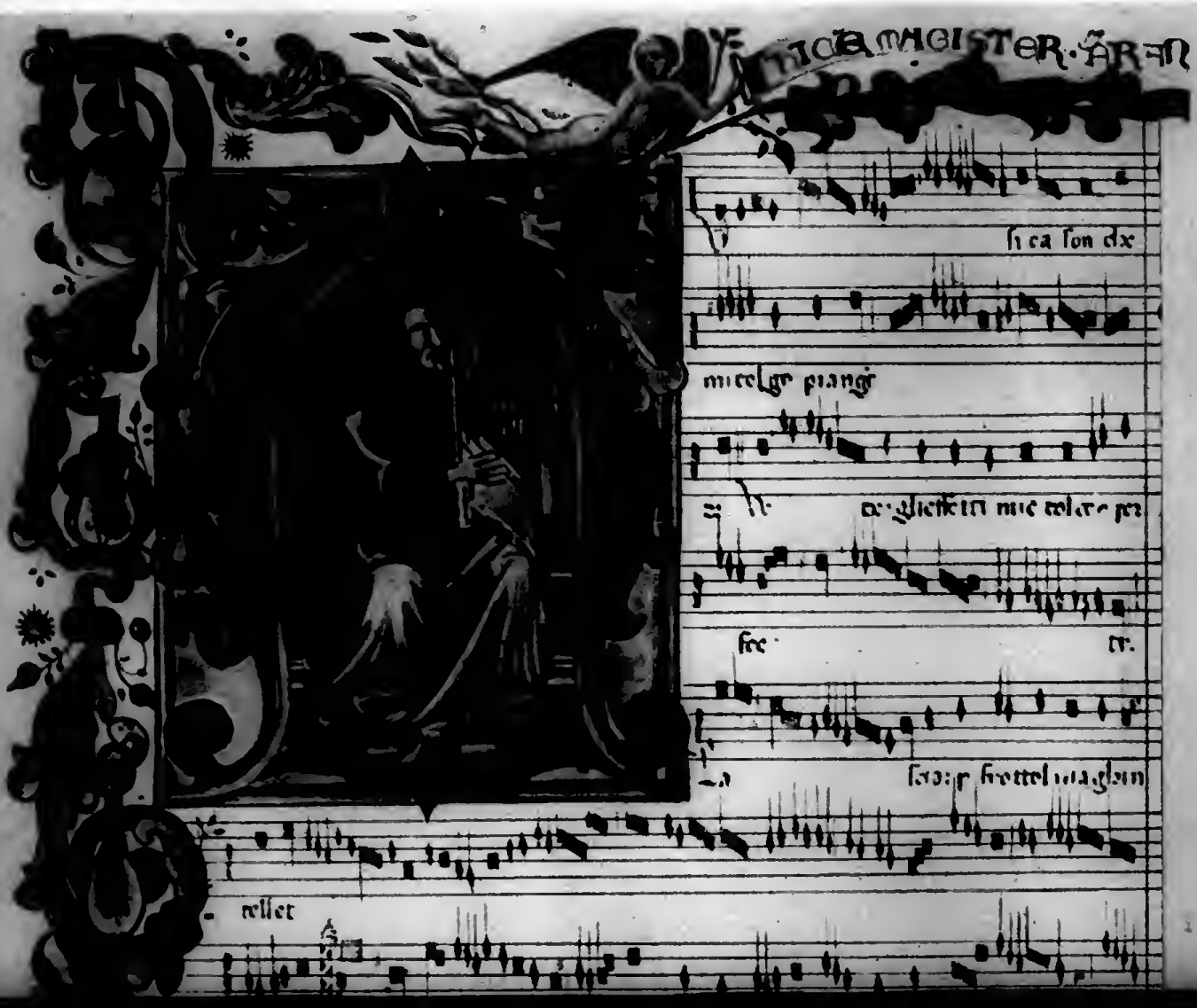
We build software that can power your drive for success. In fact, SAP software is already doing that in nine of the top ten *Fortune* 500 companies. That's because the R/2 and R/3 Systems are ready-to-run, integrated solutions for today's business-critical problems. And, they deliver high-level performance in both mainframe and open, client/server environments. Add in support for multinational currency, language and legal requirements, and it's easier than ever for offices from Paris, France to Paris, Texas to work together.

So why not make the most of your drive to succeed? Call *1-800-USA-1SAP.* You'll find out how we can help keep your business on track–no matter what's around the bend.

Integrated software. Worldwide.™

©1993 SAP America, Inc.

The New IEF for
As Revolutionary for
As Notes Were for



Client/Server. IEF Information Systems Music.

The advent of sheet music created a revolution. One that allowed different musicians using different instruments for different melodies to communicate together. One that provided common access to structured, rule-based information. One that transcended barriers of time and language, opening up a whole new world of creativity and productivity.

In other words, a revolution exactly like the new IEF for Client/Server from Texas Instruments.

Built on a 5-year track record, market leadership for rapid application development tools and a customer base that includes 50% of the Fortune 100, the IEF for Client/Server can integrate the desktop, midrange and mainframe for unparalleled performance.

The entire application, including client, server and all communication components, are developed and maintained as a whole from within a single IEF model. What's more, components can be reused in new client/server applications and deployed across different environments.

The IEF for Client/Server allows in a single specification the flexibility to generate complete applications for a variety of execution and database platforms. Which means you can go horizontally, vertically or cross-enterprise on systems such as Microsoft,® HP,™ IBM,® Sun,™ NCR,™ Sequent,™ Tandem,® Digital,™ Oracle® and Sybase.™ All without missing a beat.

The IEF for Client/Server allows IS managers and end users to work at a higher level of abstraction within the IEF information model. Alleviating the need to add languages, DBMS calls, and communication protocols. Like sheet music, the IEF gives end users and IS professionals the ability to communicate in universal language.

The IEF for Client/Server enables your business to rapidly respond to change which, in turn, increases your competitive position in the marketplace. And that's not all. TI offers products and services that effectively reengineer business processes and transition legacy systems to client/server technology.

All to extend your company's reach. And to keep your information systems working in harmony.

For more detailed information, call 1-800-336-5236, extension 1423 today.

Based on IEF the number one integrated CASE tool in the industry.*

Model-driven flexibility.

Crosses platforms.

Crosses communication barriers.

Enables change.

EXTENDING YOUR REACH WITH INTEGRATION™

TEXAS INSTRUMENTS

*For 2 years in a row, IEF (Information Engineering Facility) has ranked first in the Integrated CASE Buyers Scorecard by *Computerworld* magazine. IEF and "Extending Your Reach With Integration" are trademarks of Texas Instruments. Microsoft is a registered trademark of Microsoft Corp. HP is a trademark of Hewlett-Packard Co. IBM is a registered trademark of International Business Machines Corp. Sun is a trademark of Sun Microsystems, Inc. NCR is a trademark of NCR Corp. Sequent is a trademark of Sequent Computer Systems, Inc. Tandem is a registered trademark of Tandem Computers, Inc. Digital is a trademark of Digital Equipment Corp. Oracle is a registered trademark of Oracle Corp. Sybase is a trademark of Sybase, Inc. ©1993 TI Manuscript: THE BETTMANN ARCHIVE.

Vows and wows

During a chat last week with an industry CEO, the conversation turned to the issue of promises made, promises broken. It's a conversation I've had with a number of executives in recent months, and the talks have had a surprising similarity.

Usually I'll point out that companies get upset when reporters drag out old press releases detailing some profound product strategy the vendors had unleashed. Reporters, being reporters, then note discrepancies between all the promises made and what actually transpired a year or two later. You hear it all.

"Things changed. All that client/server stuff popped up. The economy went South. Buyers became smarter. Buyers got dumber. There was a meteor shower that portended a change in our strategy. We got a new CEO."

Vendors will then often point out that flexibility is a hallmark of a nimble, adaptive company. Or that no one can foresee the impact that a change in one sector of the industry will have downstream on another seemingly unrelated sector. For example, as one software executive noted, the rapid decline in PC hardware prices spurred laptop sales, which in turn gave renewed life to stand-alone productivity software packages and (get this) might also slow the planned introduction of improved network versions of the same packages.

OK, so we accept that things change and most major market-shaping trends are never adequately foreseen. Still, corporate users continue to be pulled along one path or another by various statements of direction, usually in the name of giving the customer a clearer vision of what's to come.

Not to pick on anyone, but go through your files and see what IBM was going to bring forth with SAA, namely one big coherent distributed processing system. It will bug IBM to see me dredging up this sore spot.

The fact of the matter is, however, that when SAA was announced in 1987, IBM was absolutely dominant. So IS managers bought into the SAA concept lock, stock and barrel. The de facto proprietary nature of SAA that lurked beneath the covers would have a vicelike grip on many users several years later, as more open computing environments emerged.

In time, the marketplace sorted out the winners and losers, with the proprietary-based companies following a road to ruin. But the way was also littered with customers who bought the vision.

A flip response would be "buyer beware." If you're so naive to buy into any vendor's long-term vision at a time when no one can clearly foresee the industry landscape more than a year out, then you'll get the trouble you deserve.

An appropriate response is to ask for more socially responsible, politically correct behavior from leading vendors. Meanwhile, we'll continue to carefully monitor the promises made and weigh them carefully against the promises kept and the promises broken.

Bill Laberis

Bill Laberis, *Editor in chief*

Structure sought

After reading Joanne Kelleher's editorial "Quick isn't dirty" [CW, July 19], I felt a little amused. Surely, few would take such naivete seriously. But then I began to think — some people really do believe you can engineer an application without any structure. Engineer a process without any structure?

The real problem with her article is the underlying management philosophy I refer to as "short-termism." The key words of this philosophy are "fast and cheap." Corporations that let these two words drive their information management direction will quickly lose the competitive battle.

In today's competitive environment, risk management is critical. There are many ways to fail and few to succeed as any entrepreneur knows. Of course, I tend to define success by how long you stay in business and how well you maintain or gain market share through product innovations, and not by how much money you made last quarter. Quick isn't necessarily dirty, but without a structure it will quickly become that way.

Jim Bennett
Kansas City, Mo.

Perhaps the term "structured methods" is a bit too rigid to use in the context of today's PC-to-mainframe range of software development. Joanne Kelleher's observation that development is devoid of or "spurning anything that smacks of a structured framework" is disturbing.

Her example of the "IS exec" who trashes the whole idea is no executive I'd like to have in my organization. Likewise, "by-the-book sorts" are as antiqnated in modern IS departments as they are in the business world today.

The only real differences we are discussing are the development platform, the degree of user sophistication and whether the software needs professional IS attention. I defy any CEO, COO or CIO to achieve anything remotely resembling successful use of computer automation in either the near or longer term if they persist in churning out glossy, colorful, piecemeal, tick-off, hit-and-miss "applicatious."

H. James Bronson
Frankenmuth, Mich.

Joanne Kelleher reports the demise of structured methods. She should know they have evolved into object-oriented design, and as such are proving very successful wherever people are solving difficult problems such as real-time simulation and control, especially where safety and reliability are paramount.

Even electronic bookkeeping systems benefit from an appropriate level of design, and these methods work for those who know how to use them. IS has rarely shown much interest or competence in design, resulting in generally poor quality and long development cycles of existing systems. It is fallacious to blame this situation on methods not used.

Andrew Raybould
Jersey City, N.J.

Let court decide

I was surprised at Paul Gillin's argument in his editorial "FTzzzzz" [CW, July 26] that the current fierce competition for the desktop is proof that the Federal Trade Commission investigation of Microsoft "is a waste of time." His position reads more like a statement from Microsoft than an editorial in an independent industry journal.

We are led to believe the presence of powerful alternatives to Windows (e.g., IBM's OS/2) and Microsoft applications (e.g., Lotus' SmartSuite) is evidence that Microsoft does not "monopolize" the industry.

But, perhaps, the fierceness of Microsoft's competitors in the face of (allegedly) unfair practices is more a statement of their competitive persistence rather than a statement of Microsoft's innocence. No one denies that competition exists, but the fundamental question remains nnanswered: Does Microsoft engage in anticompetitive practices and, if so, what would be the competitive effect of legally ending those practices?

The "final word on the Microsoft case" should be heard from the courtroom, not from the editorial pages of *Computerworld*.

Paul A. Rostick
Wayne, Pa.

■ COMPUTERWORLD WELCOMES COMMENTS FROM ITS READERS. LETTERS MAY BE EDITED FOR BREVITY AND CLARITY AND SHOULD BE ADDRESSED TO BILL LABERIS, EDITOR IN CHIEF, COMPUTERWORLD, P.O. BOX 9171, 375 COCHITUATE ROAD, FRAMINGHAM, MASS. 01701. FAX NUMBER: (508) 875-8931; MCI MAIL: COMPUTERWORLD. PLEASE INCLUDE A PHONE NUMBER FOR VERIFICATION.

More Up-to-the-Minute News!

51 Issues for ~~$48~~ Now Only $42.95

Yes, I went more. I accept your offer of $42.95* for 51 weekly issues.
That's a savings of over $5.00 off the basic subscription rate.

First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic Rate: $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295.
Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY (Circle one)**
   10 Manufacturer (other than computer)
   20 Finance/Insurance/Real Estate
   30 Medical/Law/Education
   40 Wholesale/Retail/Trade
   50 Business Service (except DP)
   60 Government - State/Federal/Local
   65 Communications Systems/Public Utilities/Transportation
   70 Mining/Construction/Petroleum/Refining/Agriculture
   80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   85 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   90 Computer/Peripheral Dealer/Dist./Retailer
   95 Other _____ (Please Specify)

2. **TITLE/FUNCTION (Circle one)**
   IS/MIS/DP MANAGEMENT
   19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   21 Dir./Mgr. MIS Services, Information Center
   22 Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele Comm., Network Sys. Mgt., LAN Mgr., PC Mgr.
   23 Dir./Mgr. Sys. Development, Sys. Architecture
   31 Programming Management, Software Developers
   41 Engineering, Scientific, R&D Tech. Mgt.
   60 Sys. Integrators/VARs/ Consulting Mgt.

   CORPORATE MANAGEMENT
   11 President, Owner/Partner, General Mgr.
   12 Vice President, Asst. VP
   13 Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   51 Sales & Mktg. Management
   70 Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   80 Educator, Journalists, Librarians, Students
   90 Other Titled Personnel

3. Are you involved in the purchase or use of the following. (Circle all that apply.)
   a. Networking/Communication Equipment
   b. PCs/Workstations
   c. Large Scale/Midrange Systems
   d. Software
   e. Peripherals

E4333-0

More Desktop Computing!

51 Issues for ~~$48~~ Now Only $42.95

Yes, I went more. I accept your offer of $42.95* for 51 weekly issues.
That's a savings of over $5.00 off the basic subscription rate.

First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic Rate: $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295.
Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY (Circle one)**
   10 Manufacturer (other than computer)
   20 Finance/Insurance/Real Estate
   30 Medical/Law/Education
   40 Wholesale/Retail/Trade
   50 Business Service (except DP)
   60 Government - State/Federal/Local
   65 Communications Systems/Public Utilities/Transportation
   70 Mining/Construction/Petroleum/Refining/Agriculture
   80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   85 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   90 Computer/Peripheral Dealer/Dist./Retailer
   95 Other _____ (Please Specify)

2. **TITLE/FUNCTION (Circle one)**
   IS/MIS/DP MANAGEMENT
   19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   21 Dir./Mgr. MIS Services, Information Center
   22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele Comm., Network Sys. Mgt., LAN Mgt., PC Mgt.
   23. Dir./Mgr. Sys. Development, Sys. Architecture.
   31 Programming Management, Software Developers
   41 Engineering, Scientific, R&D Tech. Mgt.
   60 Sys. Integrators/VARs/ Consulting Mgt.

   CORPORATE MANAGEMENT
   11 President, Owner/Partner, General Mgt.
   12. Vice President, Asst. VP
   13. Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   51 Sales & Mktg. Management
   70 Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   80 Educator, Journalists, Librarians, Students
   90. Other Titled Personnel

3. Are you involved in the purchase or use of the following. (Circle all that apply.)
   a. Networking/Communication Equipment
   b. PCs/Workstations
   c. Large Scale/Midrange Systems
   d. Software
   e. Peripherals

E4333-0

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

COMPUTERWORLD

Editor in Chief
Bill Laberis

Editor
Paul Gillin

News Editor
Alan Alper

Technical Sections Editor
James Connolly

Assistant News Editor
Patricia Keefe

Technical Editor
Charles Babcock

Senior Editors
Elisabeth Horwitt
Networking
Neil Margolis
Management
Joanie M. Wexler
Networking
Johanna Ambrosio
Systems & Software
Ellis Booker
Advanced Technology
Michael Vizard
Personal Computing
Craig Stedman
Midrange Systems

Senior Writers
Michael Fitzgerald
Melinda-Carol Ballou

Staff Writers
Lynda Radosevich
Stephen P. Kiett Jr.

New Products Writer
Lisa Davidson

Features Editor
Joanne Kelleher

Senior Editors
Joseph Maglitta, Management
Lory Zottola Dix, In Depth
Mary Brandel, CW Guide
Joyce Chutchian-Ferranti, Integration Strategies
Gary N. Ray, Firing Line
Allan E. Alter, Management

Associate Editor
Jodie Haze, Marketplace and Careers

Assistant Editor
Derek Slater

Assistant Researcher
Stefanie McCann, CW Guide

Intern
Erin Callaway

Research Manager
Michael L. Sullivan-Trainor

Research Coordinator
Kevin Burden

Chief Copy Editor
Catherine McCrorey

Assistant Chief Copy Editor
Anne McCrory

Features Copy Editors
Kimberlee A. Smith
Steven I. Condon

Copy Editors
Christine Aicardi Maguire
Jill Zolot
Ellen Fanning

Design Director
Nancy Kowal

Senior Graphic Designer
Tom Monahan

Design Assistant
Janell Genovese

Graphics Specialist
Stephanie Faucher

Cartoonist
Rich Tennant

Office Manager
Linda Gorgone

Editorial Assistants
Lorraine Witzell
Connie Brown
Aleksandra Skulte

Rights and Permissions Manager
Sharon Bryant

Computerworld Client/Server Journal
Maryfran Johnson, Editor

News Bureaus
Mid-Atlantic
Thomas Hoffman, Correspondent
(201)967-1350

Washington, D.C.
Mitch Betts, National Correspondent
(202) 347-6718
Gary H. Anthes, Senior Correspondent
(202)347-0134

West Coast
(415) 347-0555
Jean S. Bozman
Senior West Coast Editor
James Daly
Mark Halper
Senior Correspondents
Kim S. Nash
Correspondent
Chris Flanagan, Editorial Assistant

Midwest
Ellis Booker, Bureau Chief
(708) 827-4433

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
(508) 879-0700
MCI Mail: 379-6273
CompuServe: 76537,2413
Subscriptions: (800) 669-1002

Re-engineering: An emetic in a perfume bottle?

Paul A. Strassmann

There's nothing oew or original about business process re-engineering. It's just a lot of old industrial methods, recycled and repackaged to seem like the latest in management science. The only thing new about it, aside from its fancy trappings, is the situation that occasioned its revival.

Early in 1993 an epochal event took place in the U.S. For the first time ever, white-collar unemployment exceeded blue-collar unemployment, giving lie to the entrenched belief that a college education entitles you to a job with superior earning potential, long-term job security and the opportunity to climb a career ladder.

Large white-collar unemployment should not come as a surprise. The information work force has increased steadily since 1979 and now stands at 54% of total employment. This amounts to 40 millioo more information workers since 1980.

What do these people do? Mostly, they perform functions that would be categorized as corporate or social overhead — as lawyers, consultants, managers, executives and experts of all sorts. And nowhere are they more heavily settled than in government, which now employs more people than manufacturing.

Who pays for this overhead? Everybody does. Some of what we pay is extracted from increased taxes. Most of it used to be paid from increased prices. As long as U.S. firms could raise prices, there was always room for more overhead. That ceased to be true about a decade ago.

Ben Rondel

Blue-collar labor went first, as jobs were either outsourced to foreign lands or rationalized, using proven industrial engineering methods. But by the mid-1980s, major cost cuts could only come from overhead reductions.

Early attempts to reduce white-collar labor were botched. Layoffs, preceded by announcements of 20% plus across-the-board job cuts, misfired. The most valuable experts left first. The next wave was even more wasteful. Cutting overhead by imposing arbitrary targets magnified disorientation and demoralization.

Companies resorted to these crude methods because they had oo interest in assessing the value-added of information workers. They knew how to do this for blue-collar employees, but built-in bias did not tolerate subjecting management processes to this kind of scrutiny. This is where business process re-engineering came in. It rebottled well-known industrial engineering methods of process analysis, activity costing and value-added measurement.

Re-engineering excels more in its packaging than its substance. Its purpose is to make the purging of past staffing gluttony more palatable to managers. It is important that this process be palatable because, if you recall, budget cutters really can't know the consequences of their actions when it comes to management jobs. Unless they want to cut blindly, they need the tolerance and assistance of those who know something about how things work.

The cure is now administered in large doees to businesses that must keep up profits to survive. Despite ornate pronouncements about re-engineering from government leadership, it remains to be seen if the government will be willing to take the medicine. An emetic will always be an emetic, regardless of the bottle it comes in. And it only works for those who take it with the resolve to eat only what they can afford to chew.

Strassmann has served as a corporate information executive for General Foods, Kraft, Xerox Corp. and the U.S. Department of Defense.

What is your company's operating system?

OPEN MIND *by* Esther Dyson

I'm not talking about your compoter systems, but your company itself. Is it single-tasking or multitasking? Modular or monolithic?

Robh Wilmot, chairman of re-engineering company Oasis (and the man who turned around the UK's ICL), considers his firm's task to be designing oew operating systems for clients' companies, not their computers.

You can argue with this point of view, but it offers a useful framework: It makes sense to assess a company's operations *before* you think about what computer systems it might need.

That's the idea behind back-to-basics, zero budgeting re-engineering. And it makes sense strategically, too. A company oeeds to run on a smooth platform before it can worry about the details of its products, services or strategies.

Much as the operating system world developed on PCs (and, in ancient times, on mainframes), most companies start out with a single focus. There's hierarchy of management, one product line and one set of customers. The eotire resources of the company are focused on the single task of serving those customers. You can't really do two things at once, but you don't need to.

Then the company decides to go into a second business, and it usually develops a parallel, separate structure for that second busioess. That's like building a second operating system to run a second set of applications.

There's not a lot of connection between the two operations. Functions may be duplicated. But it seems easier than trying to coordinate the sharing of functions, especially because each group has its own way of doing things that's particularly suited to its target market and style of operations. (Do I hear "incompatible protocols" in the background?)

Growth spurt

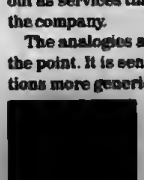
But then the company grows some more. Now it has 10 different units, each with its own way of doing things. It adds new functions that it used to buy from the ootside. Of course, each unit is a special case with its own market and style, and it *certainly* couldn't share, say, a marketing campaign or a personnel policy with another group. (Doesn't this sound just like some proprietary operating systems that have their own complex file structures, graphics standards, protocols for storing information and communications protocols?)

Suddenly sales slow and management starts looking at costs. "We're using 10 times more resources than we need!' say the accountants. ("Resource constraints.") The overload of coordination among different units is a killer. ("Middleware.")

Management would like to contract some of the work out, redoce overhead and have single cross-unit services for common functions such as purchasing, hiring, marketing and invoicing.

It will take a struggle, but that's what is needed. Services that were unit-specific (operating system-dependent) need to be separated out as services that can be used by any unit in the company.

The analogies aren't perfect, but they make the point. It is sensible to make common functions more generic (standard?) so they can be used by any function in any unit of the company. Understand your company's operating system and appropriate modules first. Then think about representing them in software and systems.



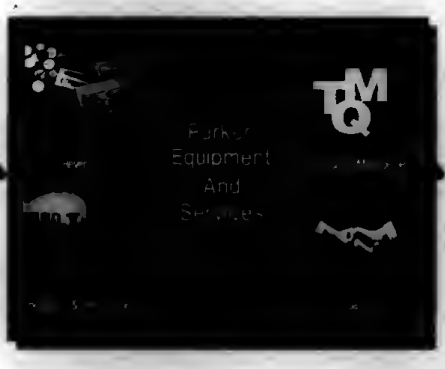
Dyson is editor of "Release 1.0" and "Rel-EAST," newsletters on new technology and new computer markets in Eastern Europe.

The Client/Server Solut

The SAS System for Information Delivery is a new concept in client/server software. It provides workable strategies for overcoming the barriers that stand between people and the information they need. For instance, the SAS System strategy for **universal data access** makes it easy to reach all your diverse "islands of information"— including host system files, flat files, and corporate DBMS's such as DB2®, ORACLE®, and dBASE®.

An exclusive MultiVendor Architecture™ is behind the SAS System's strategy for **hardware independence**. Applications run the same way across PCs, workstations, and host systems—making true client/server computing a reality while exploiting the particular strengths of each platform.

Address the needs of users at every level with the SAS System's strategy for **interface versatility**. An EIS interface puts decision makers in command of the facts—when they need them. There's also a task-oriented menu-driven interface for business



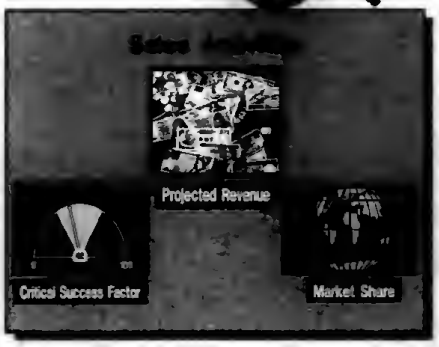
The SAS

Enterprise Wide In

ion for EIS and Beyond

analysts…plus object-oriented and full-function programming environments for applications developers.

The SAS System's **applications integration** strategy provides one seamless solution for virtually any application that involves accessing, managing, analyzing, or presenting data. Choose integrated tools for decision support, reporting, financial analysis, market research, project management, quality improvement, and more. All backed by SAS Institute Inc., a vital force in the information industry with a strong commitment to helping you succeed—and an unrivaled dedication to training, documentation, technical support, and consulting services.



See for yourself how the SAS System of software brings out the best in your hardware and the people who use it. Just give us a call at **919-677-8200** for a free video, plus details about a free software evaluation.

SAS Institute Inc.
Phone 919-677-8200
Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc.
Copyright ©1993 by SAS Institute Inc

® System

formation Delivery

Charles Babcock

Attuned to ATM

With little preamble, a half-dozen key network suppliers advanced plans earlier this year for new lines of networking products based on Asynchronous Transfer Mode (ATM). For some, ATM has displaced 100M bit/sec. FDDI and CDDI as our salvation in a world gone mad for network bandwidth. Why the switch?

For one thing, ATM has those other options beat with speeds that go to 155M bit/sec. or higher. But IBM's first ATM product is likely to be a 25M bit/sec. ATM

adapter card for workstations, so speed is not the only factor at play.

ATM is also an example of a technology that can be used in both small and enterprisewide systems. By taking the three primary forms of data — computer, voice and video — and converting each into short, 53-byte cells, ATM is able to offer a simple connection-to-connection networking approach that does what ISDN was supposed to do, only faster.

ATM switch capacities can be increased as network loads increase, guaranteeing each user a set capacity rather than dividing up the same pipeline among more and more users.

Another factor in ATM's favor is that it's one of the few networking approaches that can link multiple LANs and transmit data to the WAN. Theoretically, ATM can someday serve as both the WAN and the LAN.

These characteristics persuaded the Pacific Stock Exchange in San Francisco to convert to ATM next year for high-speed transaction and multimedia data feeds to brokers. ATM establishes a temporary end-to-end connection for each transmission, like a telephone call. A virtual circuit route is computed prior to transmission, which then allows the fixed-length packets to be transmitted, multiplexed and switched in silicon rather than through software. This is not only faster but more secure, which is a big concern for the stock exchange.

Older packet switching methods and LANs use variable-length packets that tend to be much longer than ATM's and subject to delays as each packet is routed through software. The delays make it difficult to transmit voice and video.

One of the pieces missing from a future dominated by ATM is ATM-carrying capacity in the public phone companies.

There is, however, a notable collaboration of three telephone companies under way in North Carolina, where the state government is establishing a regional ATM network to link research facilities, universities, schools and government offices for exchange of image and video files. They are cooperating to provide ATM-carrying capacity, an example that more phone companies may emulate.

ATM also lacks a multiple user access methodology, such as IBM's token passing or the collision storm detection on Ethernet. And the backbone net must possess capacity to satisfy all potential demand. If 25 users come on-line, each needing 100M bit/sec., the ATM switch will choke, even if it has a backplane capable of supporting 2.4G bit/sec.

The early uses of ATM will be for intermediate backbone functions. Bob Metcalf, the inventor of Ethernet and publisher of *Infoworld*, believes one of ATM's first opportunities will come where it can act as a facility backbone to legacy LANs. And Joel Snyder, a principal at the Mosaic Group in Tucson, Ariz., predicts ATM will provide the bandwidth for future client/server applications. "When you try to blow big databases out of a central computer, you need a bigger network" than existing LANs, he said.

These are only interim roles, however. As the use of client/server computing grows, greater throughput will be demanded of the network, and ATM will begin to fill more of the gap between desktop and global net.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

Plan now!! Attend *THE* conference that addresses the critical issues affecting competitive companies and organizations throughout the world--

The Engineering and Management of Software

Washington State Convention and Trade Center
Seattle, Washington September 18-23, 1993

Industry keynote speakers

Gerald Ebker, Chairman/CEO, IBM Federal Systems Company
Way Ting, General Manager, Visual Magic Division, Silicon Graphics

Enhance your knowledge in these key areas:

- Software Process Improvement
- Object-oriented methods
- The legal aspects of software reuse
- Enterprise-wide software management
- Emerging technologies (i.e., Ada 9X)
- Safety-critical software systems
- Distributed heterogeneous software architectures
- Software engineering education & training
- Software metrics
- CASE
- Systems engineering

Network with other software professionals from around the world, and tour a major exposition containing some of the most advanced software engineering environments currently available in the international software market.

TRI-Ada '93
GOVERNMENT • INDUSTRY • ACADEMIA

For more information, contact:

Daniell & O'Keefe, Conference Management
Chiswick Park, 490 Boston Post Road
Sudbury, MA 01776
800-833-7751 or 508-443-3330
FAX: 508-443-4715

Ever since Apple, IBM and Motorola formed their alliance, people have expected something big.

Well, it's not so big, but it's amazingly powerful.

	Intel Pentium	PowerPC 601™
Frequency (MHz)	66	66
SPECint92	64.5	>60
SPECfp92	56.9	>80
Power (worst case)	26W	25W
Die size (mm²)	262	120

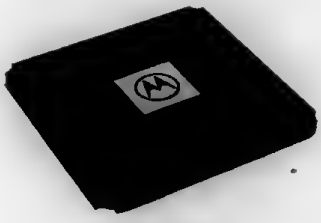
Introducing the PowerPC™ family of microprocessors from Motorola.

How powerful is our first tangible result of the Apple, IBM, Motorola alliance? Unlike any other microprocessor, PowerPC Microprocessors have the power to change the course of computing.

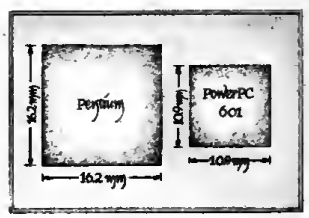
The PowerPC family of microprocessors will bring unprecedented high performance to everything from handheld computers to desktop computers to supercomputers. It will run circles around its only real competitor, the Intel® Pentium™ microprocessor, and it will do so at a fraction of the cost. It will run today's standard computer operating systems, as well as those that are being developed for pen-based and object-oriented computing.

POWERED BY MOTOROLA

©1993 Motorola, Inc. Motorola and Ⓜ are registered trademarks of Motorola, Inc. PowerPC and the PowerPC logo are trademarks of IBM Corporation. Pentium is a trademark and Intel is a registered trademark of Intel Corporation. All rights reserved. Speed comparisons are based upon press reports of performance of the 66MHz version of the Pentium as announced by Intel, and Motorola's announced simulation performance of the 66MHz version of the MPC601. Thermal comparison is based upon preliminary Intel specification for the 66MHz Pentium, and the performance of samples of the 66MHz version of the MPC601.



(actual size)



In fact, PowerPC Microprocessors will play a pivotal role in the imminent convergence of computing, communications and lifestyle products.

To take a closer look at the future of computing, call Motorola today at 1-800-845-MOTO. We'll be happy to provide you with more information, including our free PowerPC Information Pack.

And we'll show you the microprocessors that are changing the course of computing. The PowerPC Microprocessors from Motorola.

PowerPC Microprocessors. *Changing the course of computing. For the better.*

MOTOROLA

Hewlett-Packard has the most powerful vehicle for the top UNIX database applications to run on.

"If you're looking for the best strategic UNIX database platform, for now and the future, it's the HP 9000."

— Aberdeen Group*

Hewlett-Packard is the #1 UNIX* hardware vendor. So it's hardly surprising that we're also #1 with the top UNIX database vendors.

More Oracle and Informix software is sold on HP than on any other UNIX platform. And we're also the fastest growing UNIX platform for Ingres and Sybase.

Our robust, rich feature sets offer mainframe-style functionality. Another powerful reason why our customers confidently expect us to remain their #1 partner in Open Systems.

Call 1-800-637-7740, Ext. 7565 for more information.

Think again.

HEWLETT PACKARD

*Aberdeen Group Viewpoint: "Selecting a Multiuser UNIX System that Independent RDBMS Suppliers Select."
UNIX is a registered trademark of UNIX System Laboratories, Inc. in the U.S. and other countries. ©1993 Hewlett-Packard Company C508009

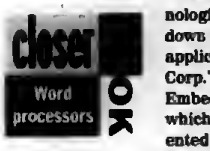
Software integration: Vendor goal for the '90s

By Michael Vizard

If the major application software vendors can fulfill the technological vision they have laid out during the last several months, the day when applications cease to be distinct entities will be at hand.

Using a variety of enabling technologies, the major PC software vendors are racing to respond to user demands for greater levels of integration among PC applications.

"The vendors are lagging the end users in terms of demand for greater integration," said Krystyna Filistowicz, an industry analyst at Dataquest, Inc.

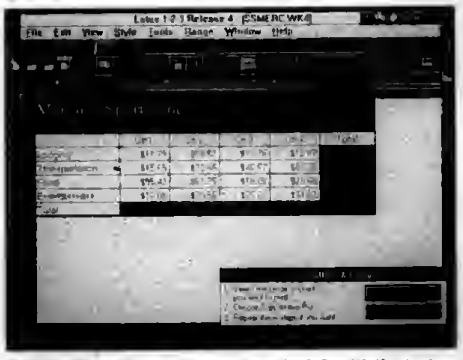


And because word processors are the applications that users tend to run on their desks most of the time, the drive toward integration will lead to the creation of an integrated suite of applications where the word processing package will often be the primary link to other applications.

"The word processor isn't a word processor anymore. It's a document you use to create proposals that include spreadsheets and presentation graphics," Filistowicz said.

Foremost among the technologies intended to break down the barriers between applications is Microsoft Corp.'s Object Linking and Embedding (OLE) Version 2.0, which provides an object-oriented application programming interface designed to help one application take control and manipulate another application in a Windows environment.

For example, a user of a word processing package will soon be able to invoke a spreadsheet using OLE 2.0. Once invoked, the user interface will automatically switch over to the the familiar command interface of the spreadsheet.



Integrating applications *such as Lotus' 1-2-3 with the Ami Pro word processor is the wave of the future*

Probably the first major applications to take advantage of OLE 2.0 will be Version 6.0 of Microsoft's Word word processor and Version 5.0 of its Excel spreadsheet, both of which are due to arrive this fall. WordPerfect Corp. in Orem, Utah, and Lotus Development Corp. in Cambridge, Mass., are also expected to add support for OLE 2.0 within the next 12 months.

But OLE, along with predecessor technologies such as OLE 1.0, the Dynamic Data Exchange facility and Clipboard, are only enabling technologies that will pave the way for a host of other enhancements that promise to make PC computing easier by creating a document metaphor, as opposed to the somewhat less than intuitive Windows environment that currently exists.

For example, Microsoft intends to use its Visual Basic programming language as a common programming language for its applications. By marrying Visual Basic with OLE 2.0, Microsoft will give users a tool for building macros that can then be applied across multiple applications using the OLE automation facility included in OLE 2.0. Similarly, Lotus has outlined a strategy that calls for a Lotus Script language, which is a derivative of Basic, to be embedded in its applications.

The upcoming Microsoft Word 6.0 *should take advantage of OLE 2.0*

User knowledge

"Having more sophisticated macro languages will be important because the users have moved beyond what word processors and spreadsheets can do on their own," Filistowicz said.

Right now, Filistowicz said Lotus enjoys a small edge over Microsoft because it has thus far made greater use OLE 1.0 to integrate its SmartSuite application package with Notes. But that edge is likely to disappear as Microsoft gears up to launch Version 4.0 of its Office suite this fall [CW, Aug. 9].

Meanwhile, the challenge for WordPerfect will be whether it can keep pace in an industry that is already dominated by software suites. "Over 70% of the applications people buy are purchased from one vendor," Filistowicz noted. And as these suites become more integrated, WordPerfect will increasingly have to rely on alliances with other vendors to sell its word processing software.

For example, WordPerfect is working closely with Borland International, Inc. in Scotts Valley, Calif., to integrate its word processing software with the Borland Office suite of applications, which is built around the Quattro Pro for Windows spreadsheet and Paradox for Windows relational database.

In addition, WordPerfect plans to focus more of its efforts on making sure WordPerfect is tightly integrated across multiple platforms using the OpenDoc technology that is being jointly developed by WordPerfect, Novell, Inc., Apple Computer, Inc., IBM and Borland [CW, July 5]. In contrast, both Microsoft and Lotus are putting most of their resources behind Windows and OLE 2.0.

Intelligence gains

Integrating applications using technologies such as OLE and OpenDoc may go a long way toward reducing the number of steps required to access data, but the effort to make software easier to use by making it more intelligent is a separate initiative that will rely on agents that will be scripted to perform tasks.

For example, Microsoft will use IntelliSense agents in the next version of its applications to automate certain repetitive tasks. Using this type of technology as a base, vendors are researching more intelligent agent technology that will be able to monitor a user's actions, and based on that data, automate a specific task commonly performed by the user [CW, Aug. 9].

"Part of the problem is that creating a document-centric environment won't add any simplicity. It will be important to add customization that is task-oriented," said Dave LeFevre, a WordPerfect product manager.

Software integration, *page 49*

Support for the future

For information systems directors, the increasing complexity of PC applications means they will have to focus on building an infrastructure to run them, while also providing the necessary levels of user support.

"I like the idea behind this type of integration, but I can wait. We have to gear up to build the infrastructure first," said Meyer Prig, president of International Business Applications, Inc., a systems integrator in New York.

In fact, the increasing complexity of supporting PC applications software has led Johnson & Higgins, a New York insurance provider, to outsource PC software support to Corporate Software, a reseller in Canton, Mass.

Today, Johnson & Higgins runs several different types of Windows applications in conjunction with Notes. Vice President William Wilson said he figures outsourcing is immediately saving the cost of one full-time person. However, Wilson said that as software becomes more complex and users discover the relatively quick response Corporate Software will provide, the real value of the contract will be equivalent to five to seven people working full time.

The good news for IS shops, however, is that while software may become more difficult to support in the future, the drive toward tightly integrated modular applications may make software easier to support.

"Rather than buying a single 100Mbyte monolithic application, people will only buy modular functions that they need to create their document," said Dave LeFevre, a WordPerfect product manager.

And when that happens, users will be much more proficient, which in turns means they will require less support from IS, according to Krystyna Filistowicz, an analyst at Dataquest.

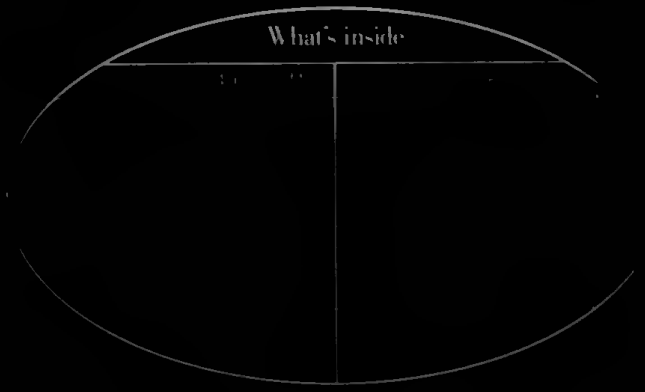
"The software is becoming much more idiot-proof," she said.

— Michael Vizard

We designed it for deep thinkers without

deep pockets.

ThinkPad 350



Human by design.

IBM

Heavy portables carry multimedia hopes

By Michael Fitzgerald

Amidst all the hype over personal digital assistants, some very heavy portables continue to draw interest in the market.

Toshiba America Information Systems, Inc.'s recently introduced T6600 multimedia portable weighs 18 pounds, but users are interested in it for its heavy-duty data capabilities. They are not pleased, however, that it has been delayed twice since it was announced. Toshiba said delays in getting master disks of software bundled with the box have slowed its ability to ship, and it now predicts a mid-September delivery.

"We have a very data-intensive business," said Michael Bennett, director of systems marketing at Nielsen Marketing Research in Port Washington, N.Y. "The products that we market to ad agencies use multiple CD-ROMs, and we have flowchart graphics that we really want to show in color."

Bennett said Nielsen's sales force currently travels to client sites with either a Compaq Computer Corp. 486C luggable or an IBM PC Co. ThinkPad 700C. Neither will accommodate in one package what Nielsen wants to do next—run segments of commercials during presentations.

"That's when I start to need different sound and data compression boards available in the Toshiba," Bennett said. The T6600 has built-in speakers and two slots to support extra boards.

Love at first sight

CB Commercial, formerly Coldwell Banker, already uses multimedia portables to make presentations. The commercial real estate broker has more than 40 T6400s, the T6600's predecessor, spread across its offices. It started using the T6400 two years ago, after seeing Toshiba make a presentation using the box.

"We got involved in a couple of presentations from Toshiba and another vendor, and when we saw how they were doing it, we really got interested," said Afshin Khoddam, vice president of application development, network technical support and telecommunications at CB Commercial in El Segundo, Calif. He added that in CB Commercial's case, the company had little interest in multimedia beforehand. "It was a case of seeing it to love it," Khoddam said.

Currently, CB Commercial uses Troy, N.Y.-based MapInfo Corp.'s MapInfo mapping software and spotlights latitudinal and longitudinal points from the U.S. Census Tracts to develop better ways to sell or lease commercial real estate. Using scanned-in photos and voice-overs, combined with an information management system on its various properties, salespeople have a handy and relatively lightweight way to tote around their presentations. CB Commercial also uses Lotus Development Corp.'s Freelance and Aldus Corp.'s PageMaker software for presentations.

Toshiba's T6600C *has caught users' attention*

When CB Commercial gets a T6600 in hand, Khoddam said he expects "we can absolutely make good use of it" to store megabyte-munching pictures on CD-ROM and run them more effectively. Khoddam also said CB Commercial is testing full-motion video as a sales tool and can use the slots in the T6600 for this.

Flexibility key

Khoddam said the T6600 will be more usable than CB Commercial's fleet of T4500Cs for making presentations.

"Its flexibility is in letting you load so much. It isn't limited because of the power of the machine," he explained.

Bennett called the new multimedia box "an enabling technology" that will let Nielsen get data off of its desktop PCs and in front of clients. This is important because "a lot of clients want to see it before they'll buy anything."

Apps take stage at MacWorld

By James Daly

BOSTON

The four-day MacWorld Exposition earlier this month allowed hundreds of Macintosh software developers to trumpet their latest and greatest wares.

Apple Computer, Inc.'s newly introduced Newton MessagePad was a popular target for a good amount of this percolating creativity, but developers also unveiled a wide variety of Macintosh-related products and initiatives that will arrive this fall. Among the announcements were the following:

➤ **Oracle Corp.** officials gave the MessagePad a nod of approval, saying they would link the Oracle 7 cooperative server database and Oracle Office messaging systems to the MessagePad via their Glue technology. Glue is an application programming interface capable of connecting diverse databases, mail systems and file systems on a variety of platforms.

The integration will enable customers to access Oracle databases wherever the user may be, according to Oracle officials. For example, an insurance company's field representative will be able to use the MessagePad and Glue to easily access a claims database at the corporate office.

No availability date was announced.

➤ Software developer **Ex Machina, Inc.** unveiled two applications that will allow the MessagePad to communicate with hundreds of on-line databases and receive wireless messages from desktop computers.

PocketCall, a terminal emulation program, allows a MessagePad user to respond to queries from host systems by simply handwriting text on the screen of the MessagePad or popping up an on-screen keyboard. The basic PocketCall application will ship in October for approximately $100.

Ex Machina's Notify for PowerTalk is a messaging service access module that works to provide wireless messages to the MessagePad. Notify will also ship in October for about $149, company officials said.

➤ **Motorola, Inc.** also jumped on the MessagePad bandwagon with the introduction of the Newton Messaging Card, a lightweight credit-card-size receiver that allows MessagePad users to receive wireless messages, data and news services virtually anywhere they go.

When not inserted into the Newton, the Messaging Card can be carried in a pocket or purse and can continue to receive and store messages wherever it is. Upon receiving a message, it notifies the user with a beep or a flashing light. The user can then insert the card into the Newton's Personal Computer Memory Card International Association Type II slot to download the message for viewing the information. The product is expected to ship in early September; no pricing was announced.

➤ **CE Software Holdings, Inc.** announced QuickAccess, which will allow Newton users to send and receive mail from a mailbox on a number of local-area network-based mail system transports, including CE's own QuickMail, Novell, Inc.'s NetWare and Apple's Apple Open Collaboration Environment (AOCE).

Officials from the West Des Moines, Iowa-based company did not announce pricing or availability.

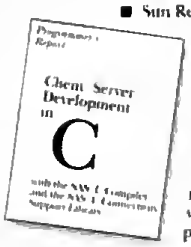
➤ On the non-MessagePad front, **WordPerfect Corp.** announced WordPerfect 3.0 for Macintosh, a new version of its popular word processing package that is in beta testing and expected to ship this fall. Version 3.0 includes support for Apple's latest technologies, including AOCE, AppleEvents, AppleScript, WorldScript and the Quicktime multimedia platform. Version 3.0 will retail for $495, WordPerfect officials said.

Now the World's Leading Mainframe C Compiler Can Help You Make Some Powerful Connections

Introducing the SAS/C Connectivity Support Library—it's just what you would expect from the first name in C programming tools for the IBM mainframe environment.

Make the Right Connections

To meet the challenges of client/server applications development, you need powerful connections. That's why we developed the SAS/C Connectivity Support Library (CSL). This comprehensive set of library routines enables C programs developed with the SAS/C compiler on your MVS or Bimodal CMS mainframe systems to communicate with applications using TCP/IP protocols on PCs, workstations, large servers, and even supercomputers.



advanced protocols to work in your own applications:

- X Window System version 11, release 5 (X11R5)
- Sun Remote Procedure Call (RPC), release 4.0
- Sun Network File System (NFS)

The SAS/C Connectivity Support Library is the first to offer NFS client and X11R5 implementations for the IBM mainframe environment. Plus, SAS/C CSL works with a variety of TCP/IP products offering you complete vendor independence.

Choose Just the Right Tools

With the SAS/C Connectivity Support Library, you can put today's most

Find Out More In A Free Report

To learn more about client/server development with the SAS/C Connectivity Support Library, simply call us today at 919-677-8290.

SAS

SAS Institute Inc.
Sales & Marketing Division
SAS Campus Drive
Cary, NC 27513
Phone 919-677-8290
Fax 919-677-8123

SAS and SAS/C are registered trademarks of SAS Institute Inc. Cary, NC, USA. All other products mentioned are trademarks of their respective companies. © 1993 by SAS Institute Inc. Printed in the USA.

On August 4, 1993 MFS Datanet Unveiled The First National ATM Network.

MFS Datanet has launched a fully operational national ATM network for high-speed data communications. Our customers already enjoy the advantages of ATM for high-speed LAN interconnect and other applications.

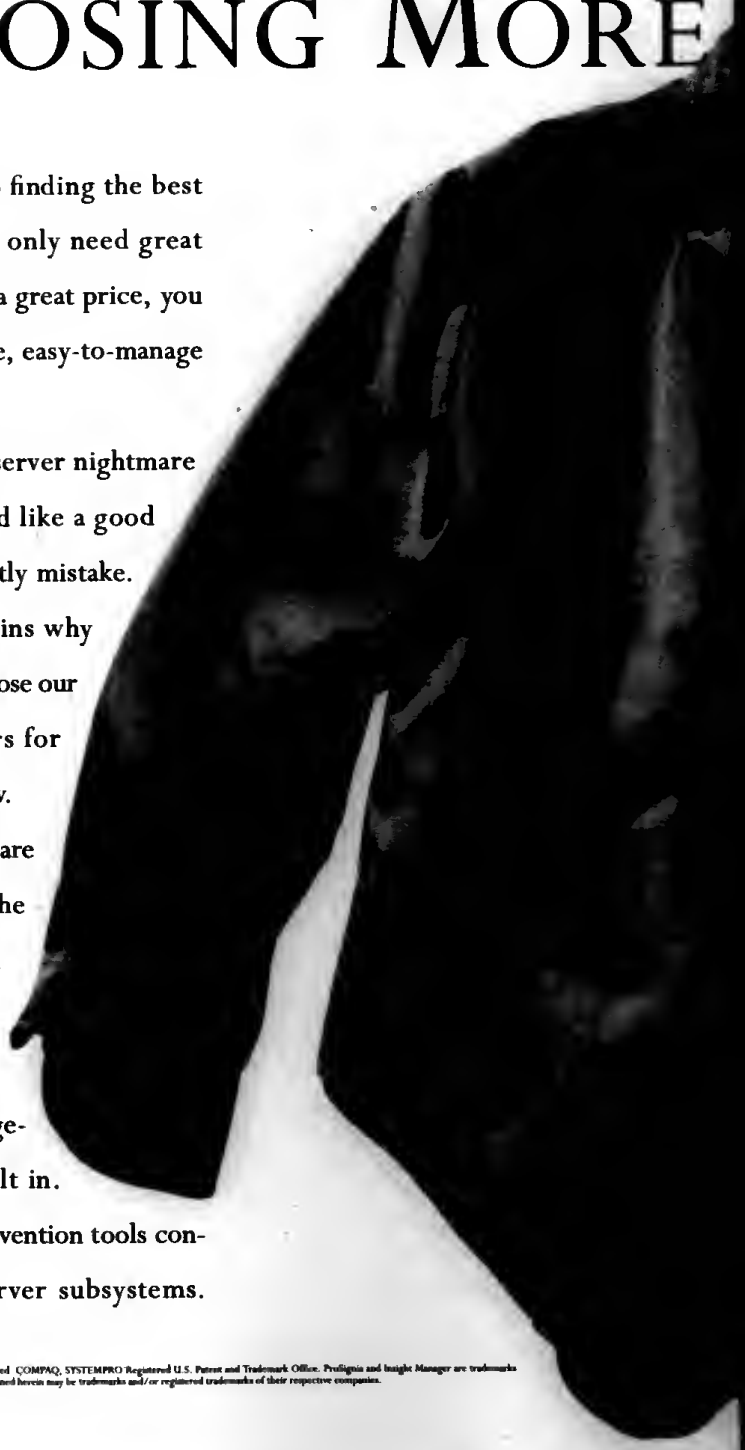
MFS Datanet offers ATM services on a national and metropolitan area basis. The company also offers High-Speed LAN Interconnect (HLI) services based on ATM technology, providing a group of end-to-end internetworking solutions connecting LANs in a single metropolitan area or across the nation. As easily as if they were in the same office, and at full native LAN speeds—or any speed you need.

First Qtr 93	Field Trials
Second Qtr 93	Customer Deployment
August 4, 1993	National Availability

MFS DATANET, INC.

Call us at 1-800-MFS-4USA 55 South Market, San Jose, CA 95113 (408) 975-2200

BUY THE WRONG RISK LOSING MORE



When it comes to finding the best server, you not only need great performance at a great price, you need the most reliable, easy-to-manage system you can find.

After all, a single server nightmare can turn what looked like a good investment into a costly mistake.

All of which explains why LAN Times readers chose our servers over all others for the third year in a row.

Because not merely are our servers leading the industry in price and performance, they're also the only servers with complete management capabilities built in.

Integrated fault prevention tools continually monitor server subsystems.

INNOVATE 93
COMPAQ WORLDWIDE TECHNOLOGY SUMMIT

Join business and technology leaders from around the world at the Compaq Worldwide Technology Conference, INNOVATE '93, Houston, Texas, 9/13-9/17. Call 1-800-235-2133.

intel inside

Using the latest processors, COMPAQ ProSignia and SYSTEMPRO/XL deliver industry-leading performance based on industry-standard benchmarks.

© 1993 Compaq Computer Corporation. All rights reserved. COMPAQ, SYSTEMPRO Registered U.S. Patent and Trademark Office. ProSignia and Insight Manager are trademarks of Compaq Computer Corporation. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.

SERVER AND YOU
THAN JUST YOUR DATA.

The COMPAQ INSIGHT Manager takes that information and alerts you to fluctuations, so you can avoid downtime. You can even program COMPAQ Servers to reboot automatically, or to contact you off-site so you can diagnose and reboot from your location.

So while others may suggest they offer close to COMPAQ performance based on their own fabricated benchmarks, you'll never hear them claim to have a more reliable, easier to manage system.

Because they don't. Not IBM. Not Dell. Not anybody.

And that's going to save you a lot more than an occasional headache. Call 1-800-638-8258 ext. 45 for details, and your free Novell Guide to NetWare 4.0. COMPAQ

COMPAQ Servers—and only COMPAQ Servers—alert you to hardware problems before they become problems, allowing you to troubleshoot and avoid network downtime.

When you build more reliable products, you can offer a more extensive guarantee. Every COMPAQ Server includes our free 3-year, on-site warranty.*

*This service provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one year warranty. For further details on our limited warranty, contact the Compaq Customer Support Center. The Intel Inside logo is a registered trademark of the Intel Corporation. LAN Times Readers Choice Award 1991, 1992 and 1993

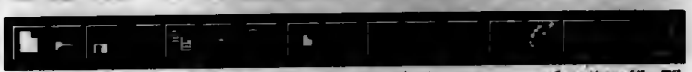
FROM WINDOWS TO HOST, IT'S THE MOST POWERFUL PATH TO A PRODUCTIVE PARTNERSHIP.

Multiple sessions, QuickPad, QuickScript™ and QuickHit productivity enhancers, and APA graphics are just a few of the strengths of IWW.

Relationships are changing. These days, the desktop and host can be powerful partners. But that requires far more from micro-to-host software than simple terminal emulation. It requires the power of IRMA™ WorkStation for Windows.

New IRMA WorkStation for Windows now includes support for NetWare for SAA® and TN3270 over TCP/IP, as well as a variety of other connections. And now IRMA/400 for Windows is available.

Unsurpassed connectivity options, including NetWare for SAA and TN3270 over TCP/IP.



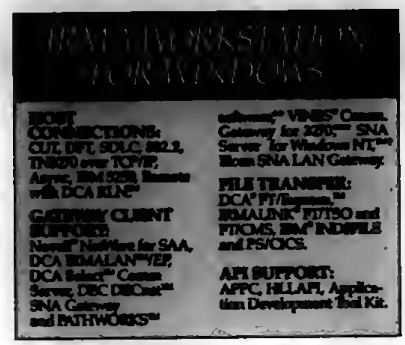
The only Windows 3270 software with a QuickBar for instant access to functions like File Transfer and Print, as well as other common 3270 commands like Reset, Clear and Attention.

IWW is also easier to use than ever. With a unique new QuickBar toolbar; QuickHit,™ to send commands by clicking on a host session PF key; and customizable QuickPads,™ to automate common tasks.

In addition, IWW supports HLLAPI and APPC, and offers new cross-platform API Tool Kits like QuickApp.™ QuickApp lets you build powerful applications without being an expert programmer. And it's the first example of DCA's Universal Communications Architecture (UCA), a framework that provides consistent access, features and APIs across host environments, network transports and operating systems.

If you haven't moved to Windows,™ IRMA WorkStation for DOS offers many of the same powerful features, and a perfect upgrade path. There's also IRMA WorkStation for OS/2 and Macintosh (with IWW NT on the way).

From now through December 31, 1993, you can upgrade to new IWW from an earlier version, or from a competitive product, for only $95. (That's $330 off the suggested retail price. And the price can be even less, when you buy MultiPaks of 10, 50 or 100.) You can also get a free demo disk.



But call soon. It's the first step on the path to a powerful new partnership.

Call 1-800-348-3221, ext. 39E,* for your $95 trade-up or a free demo disk.

THE FREEDOM TO COMMUNICATE.

DCA

*Or call (404) 475-8380. Upgrade good in U.S. and Canada only to 12/31/93. Allow 6-8 weeks for delivery. © 1993 Digital Communications Associates, Inc. All rights reserved. DCA and IRMALINK are registered trademarks and IRMA, QuickPad, QuickHit, QuickApp, QuickScript, RLN Select, IRMALAN and FT/Express are trademarks of Digital Communications Associates, Inc. Windows and NT are trademarks of Microsoft Corporation. All other trademarks are the property of their owners. Developer listed only. Novell makes no warranty with respect to this product. **Available from Digital Equipment Corp., call 1-800-DIGITAL. ***Available from Banyan, call 1-800-828-2404. †Coming soon

yes It runs with NetWare | PC | BANYAN® | digital™

SEE US AT FALL INTEROP, BOOTH #6244

Jeffrey Henning

PDA revolution

It can be tempting for the IS manager to dismiss personal digital assistants (PDA) — products such as the Apple Newton and Tandy Zoomer — as nothing more than toys. After all, the Zoomer even comes loaded with games and has built-in game keys. Meanwhile, the IS manager has more immediate technical issues to sort through, such as evaluating 32-bit operating systems.

Unfortunately for the busy IS manager, a number of factors place PDAs on the list of technologies under consideration. First, an IS manager's company may adopt PDAs with or without his blessing. Second, PDAs will satisfy some users' needs better than portable PCs do. Third, PDAs will gradually change the way traditional PCs are used.

If only performance is considered, a PDA like the Tandy Zoomer, with its 8086-like CPU, is a toy compared with any notebook PC. Of course, strictly going by performance, the first IBM PC was a toy when compared with the most prevalent computer of the time, the mini. Data center managers who dismissed PCs 10 years ago found themselves forced to confront PCs once those devices came in the backdoor. PDAs not only will come in by the backdoor, they will come in the back pocket.

Rather than be forced to develop a strategy for supporting PDAs after the fact, IS managers must make sure they have a hand in defining how their organizations integrate PDAs with existing information systems.

PDAs do offer genuine benefits. The principal benefit, despite press reports, is not organizer functionality. No company or department is going to adopt PDAs for that purpose alone when paper-bound daytimers and address books provide comparable functionality for a few dollars.

More compelling than "keeping organized" for most users is "keeping in touch," which is why AT&T refers to its PDA-like devices as personal communicators and why Apple named its first Newton the MessagePad. In the round-the-clock world market of the 1990s, time is money, and timely information is money. Voice communications are often not enough for remote workers; they need to send electronic mail, transfer files and transmit faxes.

While portable PCs provide this functionality, they are too hard to use for some workers, too bulky to be "unconsciously" portable and too expensive for widespread deployment. PDAs are therefore more suited for workers who have not yet used computers.

Interface interrupt

However, PDAs are going to change the face of computing. The interface, that is.

Apple's Newton Intelligence — the operating system of its just-released PDA — is as revolutionary as the GUI of the Apple Lisa. Newton Intelligence is the fullest incarnation of an interface called — get this! — the STICI (pronounced "sticky," what else would succeed the "gooey?").

STICI stands for Self-Teaching and Interpretive Communicating Interface. Where the GUI was a more personable interface than what went before, the STICI is a more personal interface. "Self-teaching" means the STICI customizes itself for each person that uses it; "interpretive" means the interface stores and recognizes personal information; "communicating" means the interface provides seamless management of person-to-person communications. All of these features make the STICI even easier to use and more productive than the GUI.

IS managers who dismissed the Macintosh as a cute toy found themselves behind the curve when it came time to move their organizations to the Windows GUI. They lost the competitive advantage of being able to deploy custom GUI applications ahead of competitors.

Similarly, IS managers who dismiss the STICI will be behind the times when vendors such as Apple eventually incorporate STICI functionality into PC operating systems. The STICI will make it to the PC, even as the GUI eventually made it to the minicomputer.

In the long run, PDAs will become an important part of corporate computing. Any IS manager who treats PDAs as toys may be toying with his own future.

Henning is a senior industry analyst at BIS Strategic Decisions in Norwell, Mass.

Windows boost for optical character recognition

By Ellis Booker
SUNNYVALE, CALIF

Calera Recognition Systems, Inc. put its latest optical character recognition (OCR) engine on two Windows-based desktop products last week when it announced that WordScan 2.0 and WordScan Plus 2.0 will employ the next-generation technology.

In April, Calera unveiled Adaptive Recognition Technology (ART) for its high-end OCR systems. ART, a 32-bit software system, is said to use a more sophisticated and accurate neural networking technology than previous Calera engines, reducing recognition errors by 35%.

> All OCR vendors are grappling with how to do accurate recognition of hard-to-read documents

"Nobody's OCR has trouble with clean, laser-printed text," said Kristy Holch, director of scanning market strategies at BIS Strategic Decisions in Norwell, Mass.

Rather, all OCR vendors, she said, are grappling with how to do accurate recognition on hard-to-read documents, such as incoming faxes or "10th-generation photocopies."

Back in 1990, Calera was the first OCR vendor to offer Windows-based OCR packages. Desktop systems now account for a third of its worldwide business, according to Calera executives, who said they anticipate increased activity in this category based on the mounting sales of fax modems, which have zoomed from 4,000 in 1990 to 850,000 this year.

"We estimate 70% to 80% of the images people will need to [use OCR with] will be faxes," said Wes Rose, Calera vice president of sales and marketing.

Along with an improved Windows interface and a rudimentary forms recognition capability, the new desktop products are the first OCR packages to support Microsoft Corp.'s Object Linking and Embedding (OLE) 2.0 standard. For instance, a user can drag the icon of a fax (from an OLE-compliant fax application) and drop it onto the Calera WordScan icon to initiate the OCR conversion.

WordScan 2.0 and WordScan Plus 2.0 are available through Calera's distributors for $295 and $695, respectively. Both products require 4M bytes of random-access memory, a 386-class or higher PC, DOS 5.0 or above and Microsoft Windows 3.1.

An upgrade policy for current users of WordScan is available through Oct. 31.

Software integration

CONTINUED FROM PAGE 41

These efforts will eventually lead to the creation of truly context-sensitive software that to some degree will anticipate what task a user is trying to perform.

As part of that effort, users will probably see dramatically changed user interfaces. Rather than being presented with a large selection of icons and menus, they will see a series of cascading icons that are brought into play as the user moves through a task.

Typewriter mentality

"We're at the beginning stages of rethinking what a word processor should look like. Word processors were modeled after typewriters, but now we can look at how we actually use documents," said Bill Jones, Lotus' director of product management for the Ami Pro spreadsheet.

In fact, intelligent software is likely to incorporate sophisticated logic that will provide it with the cognitive ability to check the logic of a piece of text and to incorporate speech recognition. With this in mind, Microsoft has a five-year project aimed at incorporating speech recognition with Office, said Chris Peters, Microsoft general manager for Word. This capability will be supplemented by a cognitive reasoning capability.

For example, Peters said Microsoft has a prototype Word application that knows about 100,000 facts about the world, taking up about 100M bytes of random-access memory. Microsoft hopes to teach the software the relationship among these facts, while also reducing the resources required to support this capability. Microsoft plans to then create more sophisticated grammar checkers that could evolve into devices that can essentially take dictation.

"Up until now, all the enhancements in processor speed have gone into the user interface of the application. But people don't want to learn software, so we have to make these machines easier to use," Peters said.

The challenge for software vendors will be to make effective use of hardware to accomplish these goals.

"These kind of features require very high linguistic and computational capabilities," Jones noted.

"The concept of having the computer do a lot of the thinking is the way the industry is going," LeFevre added.

[redacted]

Aldus Corp.'s consumer division has announced Aldus IntelliDraw 2.0.

According to the company, IntelliDraw 2.0 is an upgrade to Aldus' cross-platform drawing program. It was designed for the Macintosh and Windows.

Version 2.0 enhancements include expanded file support and connectivity, new drag-and-drop templates and special effects for objects and text.

It enables users to create technical diagrams, business or engineering graphics, flow charts, organizational charts, space plans, architectural renderings and more. A new Attribute Control Panel monitors and alters the size, position and line attributes of an object, the company said.

The Macintosh and Windows versions of Aldus IntelliDraw 2.0 will be available during the fourth quarter and will cost $199.

▶ *Aldus*
Suite 200
411 First Ave.
Seattle, Wash. 98104
(619) 558-6000

Is there a way to net branches without

work your company's shaking the tree?

So you've got PCs in your branch offices just waiting to be networked. But you're waiting for a solution that won't involve four different products, four different vendors, and forty days and nights of training just trying to get it all to work together.

Introducing NetWare Branch Office Solutions, the first integrated networking package for branch office PC environments.

Now, without going out on a limb, you can network your branch offices, link them to each other and to your corporate network, and manage it all from one location. Training and support are simplified, too, since Novell is the only company you need to work with.

For additional information and a free video, give us a call at 1-800-554-4446.

NetWare Branch Office Solutions

Everything you'll need to network your branch offices, in one integrated, easy-to-manage package. Includes file and print sharing, gateway and routing features, intelligent hub, messaging system and centralized system management tools. Available in SNA and internetworking versions.

yes NetWare

NOVELL. The Past, Present, and Future of Network Computing.

"I've Had It.

We're Getting Hayes OPTIMAs. They're Affordable. They're Dependable. I Can't Go Wrong."

As modem prices continue to drop, it's important that reliability doesn't. With the OPTIMA™ family, you can count on the quality of Hayes at very affordable prices. Data modems. Data plus FAX modems. Board versions. Even portables. With speeds from 2400 to 14,400 bps, OPTIMA is Hayes quality at a surprisingly low price.

SPECIAL FEATURES. OPTIMA's Automatic Feature Negotiation selects the best combination of data speed, error-control, and data compression for throughputs of up to 57,600 bps to save big bucks on phone charges. Hayes® AutoSync eliminates the need for buying special adapter cards to communicate with PCs and mainframes. And to help avoid problems like data interruption and compatibility, OPTIMA includes the Hayes patented Improved Escape Sequence with Guard Time and Hayes Standard AT Command Set. Just some of the features that helped Hayes win the Computerworld 1992 I/S Brand Preference Award in 8 categories.

EXTRA BENEFITS FOR YOU. All this low-priced reliability is packed with our famous Smartcom™ software to help you communicate easily in minutes. And it's all backed by a fast, efficient Hayes Technical Support team. Call **1-800-96-HAYES** for your nearest dealer or product literature. In Canada, call **1-800-665-1259**. Hayes quality, low prices, *and* peace-of-mind.

NEW LOWER PRICES

Think OPTIMA...from Hayes.

Hayes®

Why settle for anything less? Hayes products have the computer world talking. More than ever.

Go *Online with Hayes* BBS; call 800-874-2937 or 404-446-6336.

©1993 Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348. Hayes, the Hayes logo, OPTIMA, Smartcom, and the Hayes '302 Escape Sequence Patent icon are trademarks of Hayes Microcomputer Products, Inc.

SunSoft boosts NFS features

By Jean S. Bozman
MOUNTAIN VIEW, CALIF

SunSoft, Inc. has launched the first rewrite of its Network File System (NFS) in five years, revamping overall system performance and security of the distributed file system.

The software, which supports distributed computing among Unix workstations, PCs, Novell, Inc. NetWare-based servers and IBM mainframes, among other systems, should be installed at user sites in 1994.

Industry analysts said Sun is making the move to keep NFS current with the Open Software Foundation's (OSF) Distributed File System (DSF) and the Andrew File System used by some systems vendors. Major systems vendors, including IBM and Hewlett-Packard Co., began shipping DFS as part of OSF-compatible Distributed Computing Environment tool kits this summer.

Key distribution

SunSoft estimates there are approximately 4 million users worldwide who access files in distributed systems using Sun's NFS software. NFS is a key component of the Open Network Computing distributed computing software in SunSoft's Solaris 2.X operating system.

NFS Version 3.0 could be installed as an upgrade at hundreds of thousands of NFS sites worldwide, industry analysts said. Among key improvements, Sun said, are better performance, support for high-bandwidth networks, reduced server overhead and enhanced security.

Several analysts said client/server response time will be improved by NFS Version 3.0's expedited handling of routine confirmation messages. "Not having to wait for the confirmation that a 'write' was completed will speed things up," said Paul McGuckin, a Gartner Group, Inc. Unix analyst. Security has been improved with a new authorization process for client machines, he said.

Easy upgrade?

Users want to be able to upgrade easily to Version 3.0 — something they cannot put to the test until systems vendors ship NFS-compliant products next year. But initial reaction was positive. "It's got a lot of features that improve its reliability and its speed," said Stan Hanks, president of the Sun User Group and president of Technology Transfer Associates in Houston. "Right now, doing a write in NFS is about equivalent to scratching your nose by reaching around your back and over your shoulder. You've got to send a lot of different server requests and wait for them all to clear."

Users critical of security lapses at some sites have blamed weaknesses in NFS. Those who have seen early versions of NFS 3.0 said Sun has added Kerberos security software and tightened access to remote servers.

Workstations serve host data

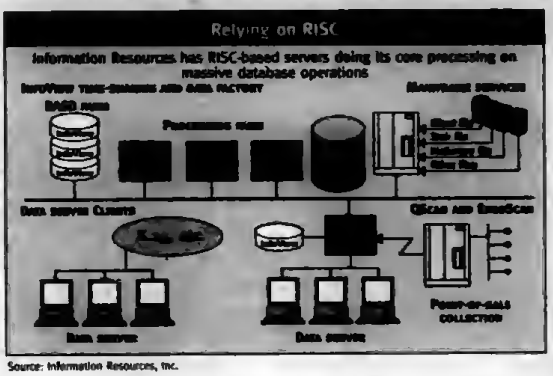
IRI offers data slices to grocers through distributed Unix system

By Jean S. Bozman
CHICAGO

Where does all the data go after your groceries have been checked through the supermarket scanner?

It usually ends up in a very large mainframe database at one of a handful of market analysis firms that sell the accumulated information to product manufacturers and retail grocery chains [CW, May 31].

One of those suppliers, Information Resources, Inc. (IRI), provides a data service called InfoScan that draws on consolidated sales data from more than 2,500 supermarkets. The resulting database at IRI headquarters is about 1.7 terabytes. Stored on IBM-compatible mainframes, the data can be accessed by end users via a custom client/server application called Express that runs on PCs.



Source: Information Resources, Inc.

Slicing up the data

Now IRI is launching a way to provide those data "slices" to retailers without first having to process the accumulated sales data from thousands of stores. Early this year, it began deploying a Unix workstation to give grocery chain managers a window on chain-specific data. That data shows sales patterns in sales at each of the chain's stores and includes a built-in decision-support database for grocery store managers (see diagram below).

A retailer's merchandising business unit uses the Unix system, based on an IBM RISC System/6000 workstation, to pinpoint products as winners or losers in the race for shelf-space placement. Because profits in the grocery business are just a few percentage points of total revenue, a detailed and timely analysis can boost profits, said John C. Mather, vice president of data systems at IRI, who heads the firm's applied technology group.

The new Unix-based QScan system is in use at 20 sites and is expected to be in place at more than 75 sites by year's end. Several IRI users refused to comment publicly on the Unix systems they are evaluating or installing, citing competitive concerns. Among them are major grocery chains in Chicago and Los Angeles, industry sources said.

Installing Unix servers and PC clients is one way $276 million IRI hopes to build market share in grocery stores, where demand for such data is booming.

The decision-support software allows managers to fine-tune supplies to local shopping patterns. IRI already has an extensive customer base for its mainframe services at the manufacturing giants that supply soap, soft drinks and canned goods to retail outlets, as does its archrival, A. C. Nielsen Co. in Northbrook, Ill.

IRI executives said the move to Unix servers for in-store analysis stems from the workstations' capacity and speed, compared with PC servers, and from the portability of Unix code to many types of hardware used worldwide. But competitive pressures are also a factor, as other firms move to supply retail chains with in-store decision-support applications.

Future versions of QScan may be ported to Unix servers from Hewlett-Packard Co., Sun Microsystems, Inc. and NCR Corp., IRI said. The firm is also launching a drive to grow its business in Europe, where Unix is popular, based on new IRI data servers installed in the UK, Germany and France.

Workstations, *page 58*

Databases

Help sources multiply

By Kim S. Nash

Database users looking to go client/server have more sources than ever from which to buy software and consulting help as firms such as Sybase, Inc. and The ASK Group, Inc. sign up systems integrators, value-added resellers (VAR) and other third-party vendors.

More choice means users can better tailor consulting packages to individual projects. For instance, for a major, multidepartment client/server initiative, a user may want to call on a systems integrator directly, instead of Sybase or ASK, to ensure dedicated, full-time help. In creating a smaller departmental system, on the other hand, users might be able to get away with buying a contained, turnkey application from a local reseller.

VAR partners

Sybase and The ASK Group's Ingres Products Division recently outlined plans to add at least 200 VARs, integrators and independent software vendors to their partner lists during the next year. Sybase, for example, recently announced an agreement with SHL Systemhouse Ltd. under which SHL will resell Sybase SQL Server databases and related products.

Channel sales are growing faster than direct sales right now, in part because customers are looking for customized consulting help as they plow into unfamiliar client/server territory, according to Bill Shattuck, an analyst at Montgomery Securities in San Francisco.

Although Sybase and others are smart to strengthen indirect strategies, the moves "aren't crucial" in the near term, Shattuck said.

Sybase and Ingres want to expand both the high-end systems integrator side of the indirect market and the low-end independent software vendor arena (see chart page 56).

Plus, the firms plan to partition off a section of staff to deal only with partners. Ingres plans to add about 30 peo-

Help sources, *page 58*

Xerox unit brings mainframe publishing tool to PCs

By Michael Vizard
SAN DIEGO

Looking to leverage the horsepower available on desktops in order to run a publishing application more economically, Document Sciences Corp., a unit of Xerox Corp., has ported its mainframe-based publishing software to PCs running Microsoft Corp. Windows.

The migration of the high-end CompuSet publishing package, which is aimed at high-volume applications that normally would have required typesetters, is driven by the desire to offload as many applications as possible from expensive mainframes.

Document Sciences President Tony Domit said he expects most of his current customers to deploy PCs essentially as coprocessors that will be used to create documents. The documents will then be transferred to mainframe systems that have more sophisticated print-spooling software to drive high-volume printers.

To create these documents on PCs, Document Sciences has provided the CompuSeries, a set of design tools that work under Windows. These tools include CompuBuild, which enables users to view documents before they are printed; CompuSpec, which is a style generation tool; and CompuMerge, which sets rules by which elements of a document can be merged with other types of information.

Finding new customers

However, while Document Sciences is predominantly targeting its existing base of 600 sites for the PC version of the product, the company is making some headway with customers who did not have CompuSet running on a mainframe before they adopted the PC package.

Chain Store Guide, a unit of Lebhar-Friedman in Tampa, Fla., that publishes directories of retail stores, recently adopted CompuSet on a 66-MHz 80486 from Dell Computer Corp. to speed the process by which it publishes 20 1,000-page directories each year.

"With CompuSet, we can print a 1,000-page directory in 12 minutes and index it in another 15 to 20 minutes," remarked Mary Barnich, manager of new technology.

Barnich said the adoption of CompuSet means Chain Store Guide can now move toward a publishing on-demand business model that will allow it to create segments of its directories for specific markets. Following that effort, Barnich said Chain Store Guide will begin looking at distributing those directories on CD-ROM drives.

"Essentially, we're moving toward perpetual updating. CompuSet was the fastest and easiest to learn of the packages we looked at. With other packages, the learning curve was too high, or we would have had to pay someone to come in and build one for us," Barnich said.

Specifically, Barnich said, CompuSet was easy to learn because its typesetting commands are based on derivatives of standard publishing commands.

"It also gives us tools to view the documents in a Windows environment," she added.

What difference does IT make?

Think about it. Information Technology. IT's making a critical difference in the industries deemed crucial to the nation's prosperity by the U.S. Council on Competitiveness—nine industries together worth over $1 trillion and employing some 12 million people. Industries as diverse as aerospace, chemicals and construction. IT is software and information processing. Systems integration and network communications. Supercomputing and desktop publishing. And much more.

IT's the industry that last year included five of the six fastest growing segments of the U.S. economy, with a growth rate in excess of 13 percent.

And Information Technology brings it all to bear for a better bottom line. By an express delivery company using IT to streamline package routing. By an aerospace company using IT to model a next generation airliner and avoid a full-scale mock-up. By a baking company using IT to cook up millions of dollars in sales force productivity gains.

The bottom line: Information Technology can mean the difference between running a business, and being run out of business. When you think about it, IT makes a major difference. To learn more, call ITAA at (703) 284-5326.

Information Technology. What you need to succeed. ITAA

Information Technology Association of America

NEED GLOBAL SALES LEADS?

Advertise in Computerworld's new Global Response Cards.

Next ad close: August 24

800-343-6474 x757

Your customer is overflowing with information.

Are you harnessing it to power your business?

To generate revenue, you need customers. To generate customers, you need information: What products and services do your customers want? When do they want them? How do they want them? Are they receptive to new offerings? Indeed, who *are* your customers?

Unisys is proud to introduce a powerful new way to answer these bottom-line questions: CUSTOMERIZE. To help CUSTOMERIZE your organization, we'll apply information strategy to customer service. Experienced Unisys consultants will help conduct a CUSTOMERIZE™ assessment of your organization. We'll help move information technology capabilities to the points of customer contact, vitalizing the information flow between you and customers. The competitive, revenue-generating benefits are tangible: enhanced ability to win business, to maximize customer relationships and tailor market-sensitive new offerings.

cus-tom-er-ize \ kŭs'-tə-mə-rīze' \ *vt* **1:** to make a company more responsive to its customers and better able to attract new ones **2:** to customerize an organization's information strategy, e.g., to extend systems capabilities to field locations and other points of customer contact and support **3:** what Unisys Corporation does for a growing roster of companies, and government agencies, worldwide *syn* see CUSTOMER SERVICE, COMPETITIVE EDGE, BUSINESS-CRITICAL SOLUTIONS, REVENUE GENERATION

Call us at 1-800-874-8647, ext. 14. Ask how our CUSTOMERIZE assessment and complimentary CUSTOMERIZE Information Kit can help launch a torrent of advantages for your business.

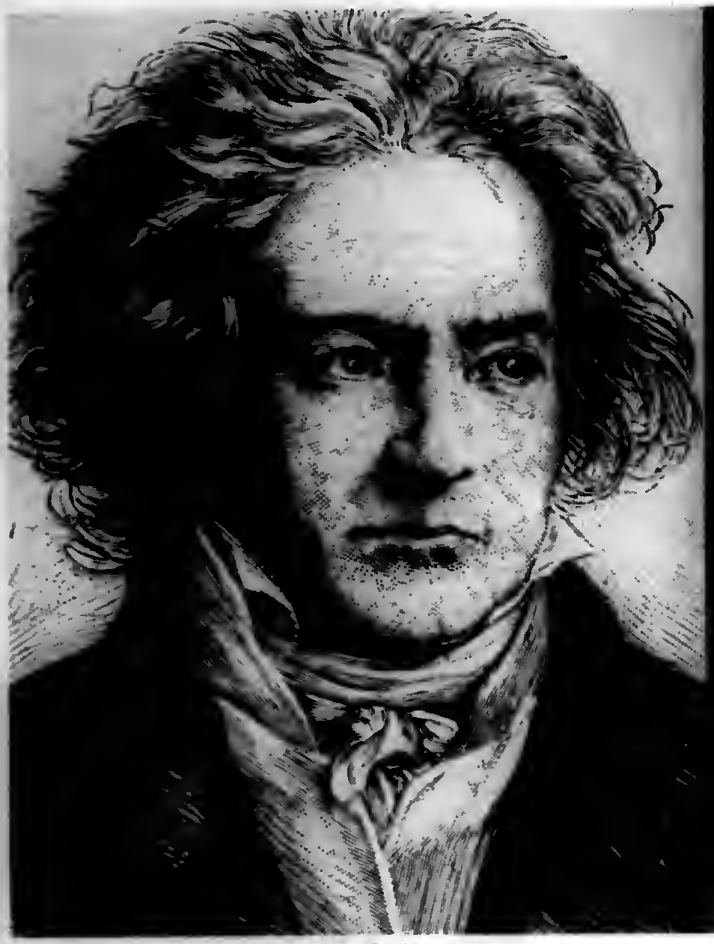
UNISYS

We make it happen.

©1993 Unisys Corporation.

CUSTOMERIZE is a service mark of Unisys Corporation

Imagine they're software.



Ludwig van Beethoven

Buddy Holly

With the new IEF for Client/Server they could play in harmony.

As revolutionary for information systems as notes were for music.

The new IEF for Client/Server is as revolutionary for information systems as notes were for music. Like sheet music does for musicians, the IEF for Client/Server provides common access to structured, rule-based information. Just as a quarter note by Beethoven means the same as one by Buddy Holly, this new application development system provides common meaning to different client/server systems.

Based on IEF the number one integrated CASE tool in the industry.*

Built on a 5-year track record, market leadership for rapid application development tools, and a customer base that includes 50% of the Fortune 100, the IEF for Client/Server can help integrate the desktop, midrange and mainframe for unparalleled performance.

Model-driven flexibility.

The entire application, including client, server and all communication components are developed and maintained as a whole from within a single IEF model. What's more, components can be reused in new client/server applications and deployed across different environments for encore performances.

Because analysis and design activities aren't restricted by the execution environment, developers can focus on defining and satisfying their individual business requirements without worrying about technology constraints.

Easier training.

The IEF for Client/Server allows in a single specification the flexibility to generate complete applications for a variety of execution and database platforms.

Crosses platforms.

Which means that you can go horizontally, vertically or cross-enterprise on systems such as Microsoft,® HP,™ IBM,® Sun,™ NCR,™ Sequent,™ Tandem,® Digital,™ Oracle® and Sybase.™ All without missing a beat.

Enables change.

The IEF for Client/Server enables your business to rapidly respond to change which, in turn, increases your competitive position in the marketplace. And that's not all. TI offers products and services that effectively reengineer business processes and transition legacy systems to client/server technology.

All so you can extend your company's reach. And enjoy the sweet sound of success. For more information on the new IEF for Client/Server, call 1-800-336-5236, extension 1424 today.

EXTENDING YOUR REACH
WITH INTEGRATION™

TEXAS INSTRUMENTS

*For 2 years in a row, IEF (Information Engineering Facility) has ranked first in the Integrated CASE Buyers Scorecard by *Computerworld* magazine. IEF and "Extending Your Reach With Integration" are trademarks of Texas Instruments. Microsoft is a registered trademark of Microsoft Corp. HP is a trademark of Hewlett-Packard Co. IBM is a registered trademark of International Business Machines Corp. Sun is a trademark of Sun Microsystems, Inc. NCR is a trademark of NCR Corp. Sequent is a trademark of Sequent Computer Systems, Inc. Tandem is a registered trademark of Tandem Computers, Inc. Digital is a trademark of Digital Equipment Corp. Oracle is a registered trademark of Oracle Corp. Sybase is a trademark of Sybase, Inc. ©1993 TI
Beethoven /THE BETTMANN ARCHIVE. Buddy Holly courtesy of Curtis Management.

Help sources

CONTINUED FROM PAGE 53

ple this summer dedicated to working with outside partners, bringing the total to 41, said John Humphreys, channels marketing manager.

Likewise, Sybase has built special product training and technical support programs dedicated to third-party partners, said Carole Louie, Sybase's channels development group manager.

Extending force

Both Ingres and Sybase hope to expand their sales by increasing the number of channel partners this year

	Sales (most recent fiscal year)	Percent of sales from indirect channels	Number of channel partners	Number of partners expected to be added this year
INGRES	$261M	15% (future projections not available)	300	200
SYBASE	[illegible]	[illegible] (expected to grow to 30% by 1995)	[illegible]	[illegible]

Commission revamp

Both companies said they are revamping the commission structure of their respective sales forces to encourage cooperation with outsiders. For example, one part of Ingres' Management By Objective plan calls for paying sales representatives as the VARs they work with reach specific milestones in end-user sales, Humphreys said.

Overall, as the newly expanded indirect strategies take hold, a division is likely to emerge between the kinds of customers who buy from resellers and those who go through database vendors directly, Shattuck said.

Corporate information systems groups equipping their firms for large-scale enterprise-size projects prefer to work directly with software and hardware companies. Departmental-level project managers historically do more business with VARs and independent software vendors selling turnkey systems, he explained.

Given that phenomenon, database makers are smart not to rely too heavily on one avenue or the other in the market share race.

Informix Software, Inc., which has traditionally depended on resellers to move its products, has made a concerted effort during the past two years or so to beef up direct sales.

Chief Executive Officer Phil White told attendees at the company's annual user conference last month that direct sales surpassed indirect for the first time this year as a percent of total revenue.

Workstations serve host data

CONTINUED FROM PAGE 53

Unix systems are a "rightsizing" alternative to mainframe database systems that cost less to build and to operate, industry competitors said.

"A Unix solution gives you more bang for your buck," said Bill Alton, national sales manager at start-up ALH Group, Inc., an IRI competitor in Manhattan Beach, Calif.

"You put your big database on Unix servers, and you've got horsepower that you could only replicate on a mainframe, and at much higher cost." Meanwhile, end users can access the Unix server's database from their desktop PCs, Alton said.

Mather said the Unix servers are already proving to be cost-effective. It takes fewer people to develop Unix code than mainframe code and less time to complete projects. The Unix QScan project began only last year.

"We're growing our business at 20% or more a year, and we're trying to keep our support costs from growing at that same rate."

Offloading

High-powered Unix servers have the potential to offload some of the data processing from IRI's five IBM-compatible mainframes.

"We believe the mainframe has a well-defined place in our architecture and will for the foreseeable future," said Ned Heinbach, president of IRI's Data Systems Division. "But we're attempting to stem [its] rate of growth because it's three to four times more expensive."

Savings on NEXTSTEP Developer Library

Get a special discount on the complete set of NEXTSTEP reference books from Addison/Wesley covering every vital NEXTSTEP topic, from interface guidelines and development tools to object-oriented programming in Objective C.

NEXTSTEP Advantage Kit

You get a detailed booklet and video cassette that take you, step by step, through the process of building a custom application in NEXTSTEP. You even get a floppy disk containing the source code.

Garfinkel & Mahoney "NEXTSTEP Programming Book"

It's the first comprehensive guide to the rich, graphical world of NEXTSTEP—providing an in-depth look at the remarkable benefits of object-oriented programming. In the book stores, it would cost a good $39.95. But it's yours free with the purchase of the NEXTSTEP Evaluation Kit.

NEXTSTEP Developer

Complete and unabridged, you get all the developer's tools for NEXTSTEP. That includes Interface Builder and the full library of objects and kits (Application Kit, Database Kit, color picker, print/fax objects and more), as well as exhaustive online documentation.

Hardware

Winchester Systems has announced FlashServer, a family of controllers, disk subsystems and file servers.

According to the company, the family targets Novell, Inc. NetWare and Unix networks with growing user populations and client/server applications that demand data reliability and high-performance servers.

FlashServer achieves 6,000 I/O operations per second by combining redundant arrays of inexpensive disks reliability and multichannel, multiprocessor I/O performance, the company said.

Prices start at $6,075.

▶ *Winchester Systems*
400 West Cummings Park
Woburn, Mass. 01801
(617) 933-8500

Alphatronix, Inc. has announced the availability of its Inspire III family of optical libraries.

According to the company, Inspire III is based on the 1.3G-byte double-density disk format; it offers 20G to 190G bytes of storage. The product uses a native storage device driver that was designed for trouble-free operating system upgrades. The driver also provides application software compatibility.

Inspire III library systems are available for IBM RISC System/6000, Digital Equipment Corp., Sun Microsystems, Inc., Scitex Corp. and Macintosh platforms.

Prices start at $14,900.

▶ *Alphatronix*
Suite 315
4022 Stirrup Creek Drive
Durham, N.C. 27713
(919) 544-0001

Interphase Corp. has introduced the Performance Networking Power Kits, Fiber Distributed Data Interface (FDDI) packages targeted at Hewlett-Packard Co. and Sun Microsystems, Inc. workstation users.

Four FDDI adapters, software drivers and the company's workgroup M800 FDDI Concentrator are included in each kit. Prices range from $10,175 to $26,955.

▶ *Interphase*
13800 Senlac
Dallas, Texas 75234
(214) 919-9000

Software

Unidata, Inc. has started shipping Release 3.1 of the UniData relational database management system and application development environment.

Full standards-based integration with third-party PC client-side interactive tools is provided, according to Unidata. On the server side, UniData Release 3.1 was designed to offer full access to Ingres Corp., Informix Corp., Oracle Corp. and other databases, the company said.

Prices range from $315 to $610 per user.

▶ *Unidata*
Suite 3050
999 18th St.
Denver, Colo. 80202
(303) 294-0800

Network Imaging Corp. has announced its Hierarchical Storage Manager client/server software.

According to the company, the software automatically migrates the oldest inactive files on a PC hard disk to file libraries stored on tape or optical-disc storage systems attached to either Novell, Inc. networks or Unix.

A file can be accessed and retrieved once it has migrated to the file library and transported back to a magnetic hard disk, providing users with instant access to information.

The software is capable of reducing on-line data storage costs by 75%, the company said.

Prices range from $15,000 to $60,000.

▶ *Network Imaging*
500 Huntmar Park Drive
Herndon, Va. 22070
(703) 478-2260

Product shorts

General Automation, Inc. has released the A500 and the A500XL computers, two additions to its Advantage Series family. The products are offered in compact tower enclosures and include the R91 Enhanced Pick Application Environment, its advanced implementation of Pick Systems' Pick relational database system. Cost: The A500 is $66,000; the A500XL is $109,000. General Automation, Tarzana, Calif., (818) 757-0070.... **Siren Software Corp.** has introduced Siren Editor, a Motif-based text editor that runs on several Unix platforms. It has a shell facility, multifile windows management, a column-mode editing capability and auto-save, auto-backup and auto-recovery facilities. Cost: $249. A five-user license is $995, and a 10-user license is $1,795. Siren Software, Menlo Park, Calif., (415) 322-0600.... **Blueridge Technologies, Inc.** has announced Optix PC View, Windows client software for the Optix Network multiuser electronic document management system. According to the firm, the product enables IBM-compatible workstations running Windows to access the Optix Network Unix/SQL-based document imaging and text server. Cost: Starts at $75,000. Blueridge Technologies, Flint Hill, Va., (703) 675-3015.

THERE'S NO QUESTION ABOUT OBJECT-ORIENTED NEXTSTEP THAT $299 WON'T ANSWER.

If you're a developer of mission-critical custom applications, you've already heard the talk about object-oriented software. It's time you experienced the real thing: NEXTSTEP™ for Intel® 486 and Pentium™ processors is here.

For a limited time, you can get the whole system — developer and user versions — for only $299*. (Quite a deal, considering these versions alone retail at $795 and $1995 respectively.) And this isn't some watered-down version of NEXTSTEP. It's the real thing. Fully functional. Including all the tools you need to develop and run your custom applications on industry-standard hardware. This offer even includes all of the informative and money-saving extras you see to the left.

OFFER EXTENDED UNTIL SEPTEMBER 30, 1993

1-800-TRY-NeXT

Yes, the deadline is real. But so is our offer. Order our Evaluation Kit for only $299, and we'll send you the complete, fully functional, object-oriented NEXTSTEP for Intel processors. This offer includes both the user and developer versions, full NEXTSTEP development tools and all extras described in this ad.

To order your own NEXTSTEP Evaluation Kit, just call 1-800-TRY-NeXT. You'll find out why so many people are calling it the most advanced software in the world. No question.

NEXTSTEP Release 3.1

With the full user environment, you'll see how NEXTSTEP applications use objects to work together, and call on system services such as e-mail and faxing. It's a seamless world in which custom-developed NEXTSTEP applications integrate perfectly with off-the-shelf products (as well as MS-DOS and Windows applications).

THE OBJECT IS THE ADVANTAGE.™

©1993 NeXT Computer, Inc. All rights reserved. NeXT, NEXTSTEP, the NeXT logo and The Object Is The Advantage are trademarks of NeXT Computer, Inc. Intel is a registered trademark of Intel Corporation. All other trademarks mentioned belong to their respective owners. *Special offer does not include developer documentation or free upgrade to NEXTSTEP Release 3.3

THE COMPAQ UL
FOR BRIGHTER BRIGHT

Tired of everything looking dingy and gray? Embarrassed by dull whites and faded blacks? Try UltraView. The exclusive screen of the LTE Lite 4/25E. It's the only black and white active matrix VGA screen on the market. And the brightest, highest-contrast screen availa... it

intel inside

© 1993 Compaq Computer Corporation. All Rights Reserved. Compaq Registered U.S. Patent and Trademark Office. UltraView and LTE are trademarks of the Compaq Computer Corporation. The Intel Inside Logo is a trademark of Intel Corp

TRAVIEW SCREEN.
S AND WHITER WHITES.

separates whites from blacks and keeps them looking sharp. And for a limited time, you can call 1-800-PREBATE, ext. 850 and receive a check worth up to $250 on every purchase of an LTE Lite. Which means the best reason not to wait for a color screen is right here in black and white. COMPAQ

oration. Paint Shop Pro provided by Jasc Inc. Specific PREBATE terms and conditions apply. PREBATE offer available in the U.S. through 9/30/93. Not valid with other Compaq products or promotional offers or through Compaq DirectPlus.

Hewlett-Packard computer systems helped Spalding's worldwide revenue grow four times faster than the industry average.

"Our HP 3000s have taken the worry out of daily operations and future growth. They leave us free to concentrate on customer service."

— Bard White, Spalding's CIO and Worldwide Director of MIS

Instead of investing in mainframes, Spalding looked for a better way to manage its growing business. A way that would make the 115-year-old sporting goods company more responsive to customer demands around the world and save money at the same time.

So HP developed a networked solution built around powerful HP 3000 Business Systems in a dozen data centers and distribution hubs worldwide. This gives Spalding instant global access to management information, helping them react quickly to changing consumer needs, and deliver products faster.

To learn more, call 1-800-637-7740, Ext. 7460 for our free video, *Strategic Computing*, starring some on-the-ball business leaders. It shows why you might want to rethink your company's game plan.

Think again.

HEWLETT PACKARD

©1989 Hewlett-Packard Company CSY8306

Wireless starts to rival fiber speeds

By Joanie M. Wexler
NEW YORK

Users worried about traditional low-speed wireless technology's ability to handle tomorrow's bandwidth-guzzling applications may find solace in the promise of emerging wireless techniques reputed to rival fiber-optic capacity.

CellularVision of New York, Inc., for one, plans to soon roll out its 1G bit/sec. wireless network, also called CellularVision, in the New York area. Regional Bell operating company Bell Atlantic Corp. will operate the network, the firms announced earlier this month.

CellularVision affords high enough speeds for interactive cable television and other multimedia applications, according to the vendor. The company's ability to deliver the technology is the result of its success in fanaging large amounts of bandwidth in the 28-GHz frequency range from the Federal Communications Commission last December [CW, Dec. 21, 1992].

The spectrum had been reserved for point-to-point communications but was largely sitting idle, said Bernie Bossard, company co-founder and inventor of the CellularVision technology.

CellularVision already provides wireless cable TV services to 200 customers through a test in Brooklyn's Brighton Beach for $29.95 per subscriber. It plans within two years to cover 75% to 80% of the New York territory for which it has a license, said Shant Hovanian, CellularVision president, who added that the company hopes to begin commercially marketing services next year. The area includes the five boroughs of New York and a few surrounding counties.

"This is an electronic superhighway alternative for New York customers who have not been supported up to now," Hovanian said.

Business issues

However, for business, it might be "difficult to operate on a consistent basis," said Jeff Marshall, senior managing director of communications technology at Bear, Stearns & Co., a New York brokerage firm.

This is because there are security issues surrounding the integrity of the bandwidth, Marshall said. "We need some guaranteed delivery mechanism" regardless of whether lightning or other havoc-wreaking weather conditions strike, he explained.

Marshall did say, however, that high-speed wireless "might make a good alternate route" for backing up cabled networks and should serve the last leg of residential cable routes "where fiber leaves off at the curbside and wireless goes into the home."

Meanwhile, Zenith Electronics Corp. in Glenview, Ill., demonstrated its Z-View protocol, formerly used for real-time interactive services running on cabled networks, over the airwaves at the Wireless Cable Convention in Orlando, Fla. The firm demonstrated a two-way video-on-demand ordering application that traveled 16 miles each way in about five seconds.

Zenith expects to have its 45K bit/sec. technology deployed internationally in production networks within six months, said Barry Hardek, product manager for Zenith's Cable Products Division.

Hardek said the main reason for using wireless as a cable alternative is its dramatic cost savings. He estimated a new cabling system would cost about $1,200 per subscriber to build, while a wireless version would run about $500 — savings that would presumably be passed on to subscribers.

Zenith also demonstrated a prototype of a modem attached to a home computer for wirelessly accessing Prodigy Services Co. bulletin board services.

Diagnostic agents to tie to central console

By Elisabeth Horwitt

■ Harried network administrators may find relief in a trend toward the linking of increasingly intelligent local-area network diagnostic agents to domain and enterprise network management systems.

The ideal, which is not quite reality for most products, is for such agents to act as local monitoring and diagnostic systems for one or more segments, gathering valuable data about the status of LAN traffic, error levels and devices and returning it to a network administrator's console.

ProTools, Inc. recently announced that its Network Control Series LAN diagnostic tools will be able to provide high-level LAN diagnostic information to IBM's NetView/6000 and LAN NetView, Hewlett-Packard Co.'s OpenView, AT&T/NCR Corp.'s StarSentry and Ungermann-Bass, Inc.'s Windows- and Unix-based NetDirector.

The Beaverton, Ore., vendor's Cornerstone Agent uses the Remote Network Monitoring (RMON) protocol to monitor LAN segments. A diagnostic engine can act as a stand-alone management system, analyzing the information collected and sending key alerts up to a central enterprise management system such as OpenView, according to ProTools President and Chief Executive Officer Ed Snyder. The engine/agent can also send diagnostic data to ProTools' own domain network manager, Foundation Manager.

Getting smarter

ProTools is also working to add intelligence to its Network Analysis Engine, which sits on its Foundation Agent and does local processing of LAN data, Snyder said. The engine will be able to interpret incoming diagnostic information about all seven layers of the protocol stack with increasing intelligence: For example, it will determine that an error at the user layer means a printer just went down, Snyder said.

Diagnostic agents, *page 65*

VSAT system offers bridging, routing

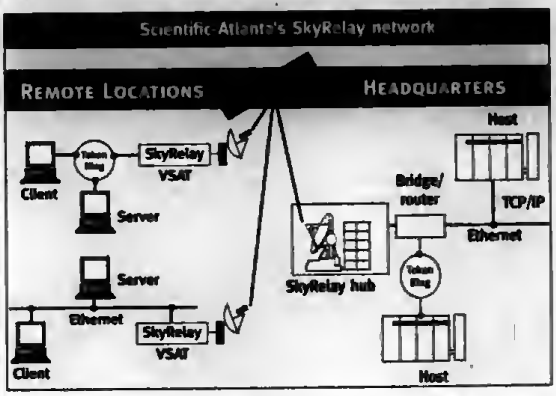
By Gary H. Anthes
ATLANTA

Scientific-Atlanta, Inc. announced a VSAT satellite system geared for wide-area internetworking among heterogeneous local-area networks.

The company said its very small-aperture terminal (VSAT) system, called SkyRelay, was designed especially for companies with distributed computing at 100 or more sites, including firms in the retail, automotive, distribution, financial and travel services industries.

SkyRelay will support mission-critical applications requiring remote file access, file manipulation and large file downloads, Scientific-Atlanta said. Companies buying it are also likely planning to add broadcast video and audio communications to their data networks, according to the firm.

The satellite-based system supports Ethernet and Token Ring LANs and is the first VSAT product to provide both bridging and routing capabilities. The SkyRelay bridge/router supports a number of internetworking approaches such as source routing, transparent bridging and Internet Protocol routing.



SkyRelay uses a frame-relay backbone protocol that the company said is more efficient than the X.25 protocol used in an earlier VSAT product. It is ideally suited for the "bursty" traffic typically seen in LAN interconnections.

The product includes network management software for automated command and control, performance monitoring, traffic analysis and trouble ticketing, all consolidated on a single Unix workstation.

SkyRelay systems can be configured to provide up to 256K bit/sec. bandwidth outbound from headquarters and up to 128K bit/sec. for inbound traffic. In addition, optimization features allow for "bandwidth-on-demand" to economically budget for peak transmission needs, said John Russell, marketing manager.

Russell said Scientific-Atlanta will sell SkyRelay as a turnkey wide-area network. He said a company with 500 locations would spend $300 to $400 per month per location for SkyRelay, assuming a five-year amortization of hardware and software and a normal allowance for recurring costs such as operations and maintenance.

That cost estimate assumes a representative mix of communications, including interactive traffic, client/server applications running over the network, file transfers and downloads and messaging.

SkyRelay will be available by year's end. There is one beta-test user, a retail chain with 200 to 250 outlets, but Russell declined to name the company.

Stratus' Unix systems to act as SNA hosts

By Craig Stedman
MARLBORO, MASS.

Stratus Computer, Inc. plans in the first half of 1994 to add capabilities to its Unix-based fault-tolerant computers enabling them to act as full hosts in IBM Systems Network Architecture (SNA) environments, where Stratus machines are now used mainly as front ends to mainframes.

Stratus hopes the Primary SNA support will position its high-end XA/R Unix systems as downsizing platforms for offloading mission-critical mainframe applications. That would complement a new low-end client/server strategy that the company embarked on this month.

Full SNA support has been built into Stratus' proprietary VOS operating system for several years, but that is not attracting much downsizing business, acknowledged Christine Carlson, Stratus' SNA product manager. "It didn't necessarily make as much sense to move from one proprietary system to another" as it does to go to Unix, she said.

Full speed ahead

Stratus' FTX Unix derivative is expected to account for 20% to 25% of sales this year and become a larger seller than the proprietary VOS operating system in 1995, said Barbara Babcock, vice president of corporate marketing. FTX should become "very comparable" in functionality to VOS within six to nine months, she added.

With lower-cost conventional systems becoming more reliable, Stratus is facing tougher competition at the front-end level, noted Richard Schreiber, president of ATB Associates, Inc., a Wellesley, Mass., consultancy. "They're trying to carve out a new niche for themselves" with the host strategy, he said.

Target VOS

Schreiber and other analysts were uncertain how much downsizing business Stratus will attract. Peter Kastner, an analyst at Aberdeen Group in Boston, said he expects the main target market for the Unix SNA products through 1994 to be Stratus' own VOS installed base.

However, he added that VOS customers still appear to be concerned about the reliability of Stratus' FTX Unix derivative, despite the company's rewriting of the Unix kernel to make it more robust. "The answer we hear is 'Show me,'" Kastner said.

"Whether justified or not, FTX is regarded as less reliable," agreed Omri Serlin, publisher of the "FT Systems" newsletter in Los Altos, Calif. "And if FTX is not perceived as rock-solid, that kind of blows away the whole marketing rationale" for using it as an SNA host.

A VOS user at a major U.S. bank, who asked not to be identified, said he has no plans to switch to FTX, partly because of the reliability issue. The bank is not having problems with the VOS version of SNA but still views the Stratus machines as best-suited for front-end uses, he added.

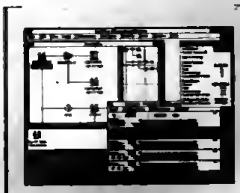
Stratus officials said they hope to make FTX as reliable as VOS in the next release. Initial SNA capabilities were introduced this month for FTX such as FTX Secondary SNA, which allows Stratus systems to act as a remote 3270 cluster controller, and FTX APPC, which supports IBM's Advanced Program-to-Program Communication (APPC) protocol.

Both products and the FTX Primary SNA software due out next year are based on SNA code licensed from IBM. Carlson said Stratus is developing its own network routing software for controlling terminals and printers attached to mainframes from an FTX-based system. That software is also due out in the first half of 1994, she said.

Clean up

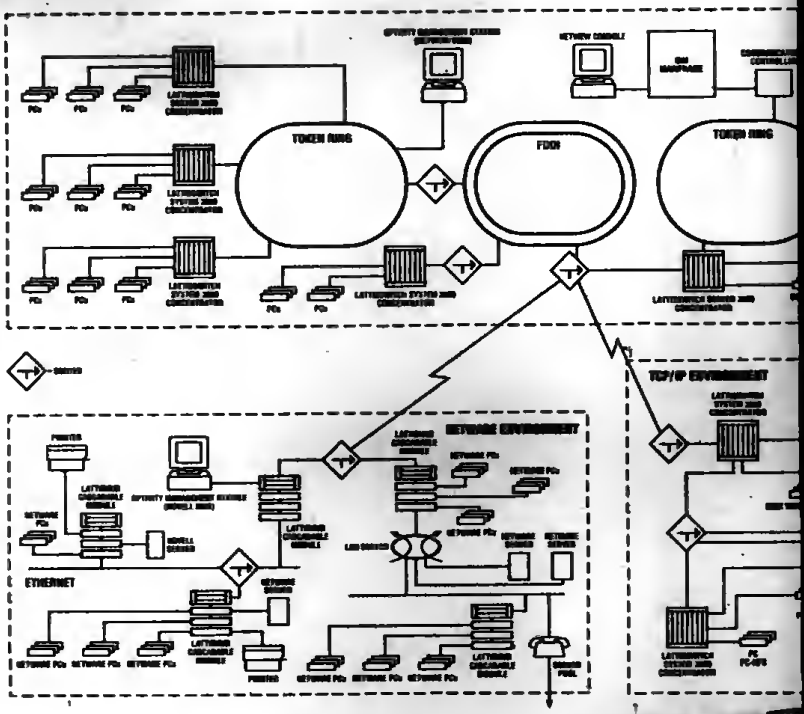
Network management can get messy—especially when you have multiple environments. Fortunately, the people who helped you build your network have a cleaner way to manage it all.

SynOptics is a natural choice for network management. We not only pioneered the intelligent hub, but we were the first to provide integrated SNMP management in Ethernet, Token Ring and FDDI networks. As a result, we've become the hub of network management for over six million users worldwide.



SynOptics' Optivity™ network management system is integrated with all the leading open management platforms.

With SynOptics, your whole approach to network management is cleaner. Our Optivity™ and LattisWare™ software solutions support all major network technologies, as well as emerging ones like ATM. Be it SNA,™ NetWare,® TCP/IP, or a mix of all three, our customized solutions handle it all. For example, we've integrated Optivity and LattisWare



© 1993 SynOptics Communications, Inc. Optivity and LattisWare are trademarks of SynOptics Communications, Inc. All other brand or product names are trademarks or registered trademarks of their respective companies. SynOptics' GSA numbers are GS00K93AGS6170 and GS00K92AGS5494.

Want to see more?

To receive more information about our cleaner approach to network management, simply complete this card and drop it in the mail.

Name _____

Title _____

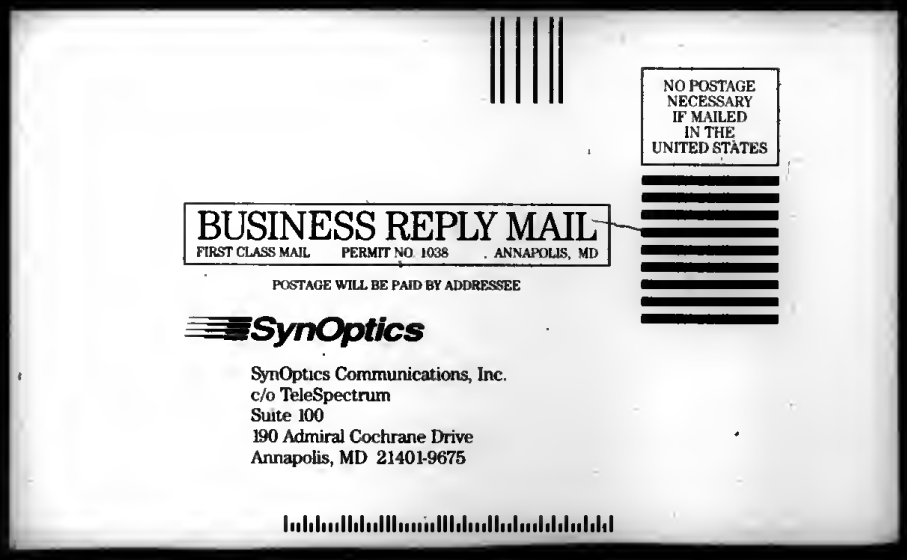
Company _____

Address _____

City/State/Zip _____ Telephone _____

SynOptics

MA9307B-CWLD



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 1038 . ANNAPOLIS, MD

POSTAGE WILL BE PAID BY ADDRESSEE

SynOptics

SynOptics Communications, Inc.
c/o TeleSpectrum
Suite 100
190 Admiral Cochrane Drive
Annapolis, MD 21401-9675

Diagnostic agents tie to central console

CONTINUED FROM PAGE 63

This high-level interpretation can be of use to companies that cannot afford to put a network expert at each LAN segment. It also can save bandwidth by sending the results of diagnoses, rather than raw diagnostic data, Snyder said. The data can be sent directly to the databases of the enterprise network management system or can be displayed on its console.

Rochester Gas & Electric Corp. currently uses two Foundation Managers and 12 Agents. The distributed diagnostic system was a welcome change from ProTools' early portable diagnostic tools, according to Al Oliver, lead analyst for the Rochester, N.Y., utility. "The interface is easy to use and even when you have an intelligent person to do the analysis, [the old product required that person] to throw it over his shoulder and wander hither and yon" to fix problems on distributed LAN segments.

With the Foundation Manager and Agents, Oliver said, "I can sit at my desk and perform analysis on an operation 45 miles away." Also, the Agents generate alarms in real time and use history logs to capture snapshots of Ethernet and Token Ring events according to preset parameters, so Oliver can do trending, he said.

The utility is currently evaluating which enterprise network manager to implement, with IBM's LAN NetView, an OS/2 LAN management system, a strong contender, Oliver said. He is currently using the OS/2 version of the ProTools product, which he said is easy to maintain using IBM's Configuration, Distribution and Installation product.

Still to solve, however, is the problem of updating and maintaining the distributed machines that run the diagnostics, Oliver said. ProTools promised to provide the ability to upgrade agents remotely with the upcoming Version 1.4, he added.

Does Windows and OS/2

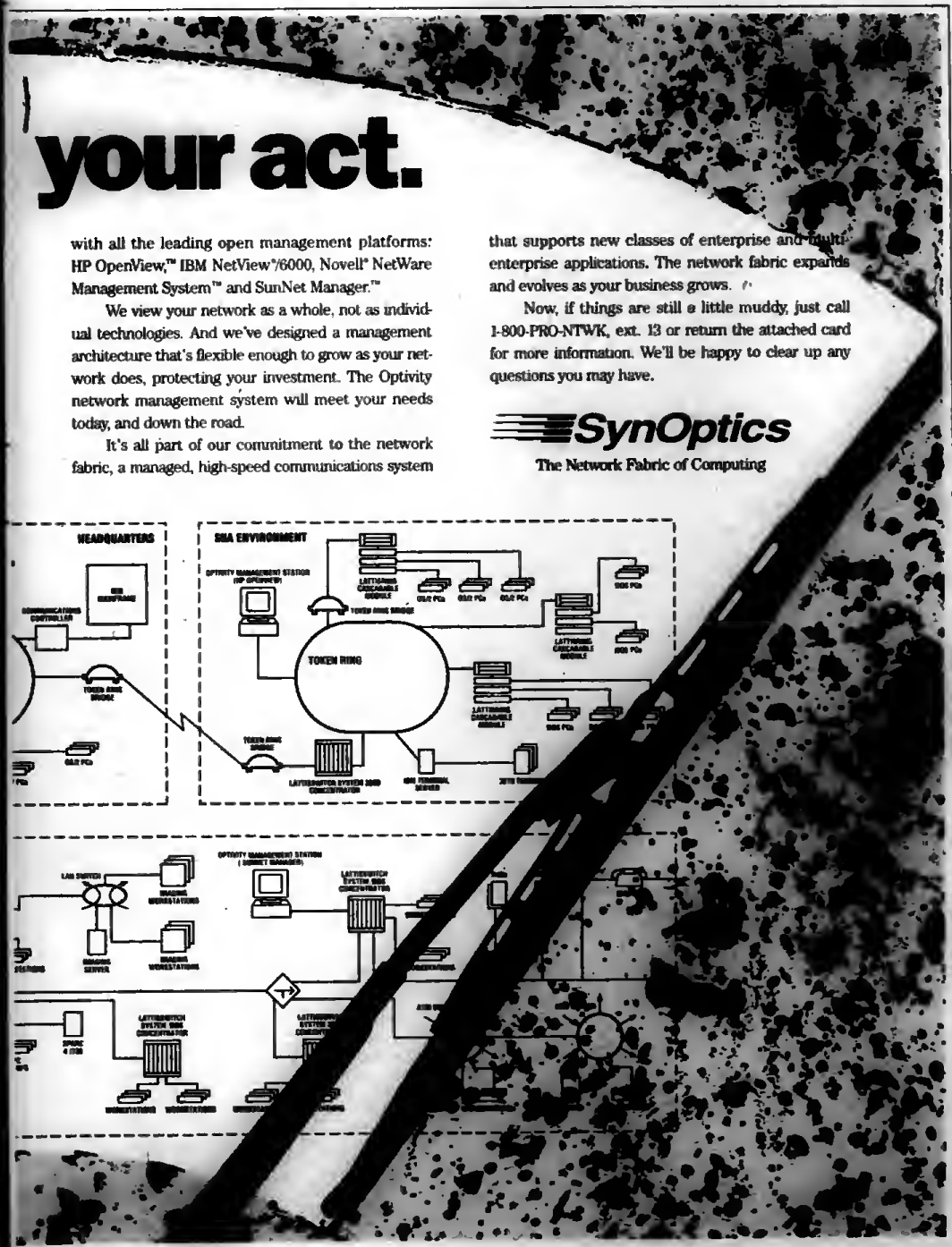
The company also announced recently that Foundation Manager and Agents will support, besides the current Unix version, OS/2 and Windows 3.1 versions. This addresses those users who are accustomed to OS/2 or Windows and resist dealing with a Sun Microsystems, Inc. SPARCstation running Unix just to have local network management, Snyder said.

HP, Sun and Novell, Inc. are all working on similar systems of their own. HP's LANprobe, an RMON-based diagnostic tool, can feed information to OpenView. Over the longer term, a more intelligent LAN diagnostic tool from HP acquisition Metrix, Inc. will feed data into OpenView, an HP spokesman said.

Novell's answer to users' distributed LAN diagnostic needs will be based on a long-promised RMON version of its LANalyzer product, which will feed into Novell's NetWare Management System (NMS), a Novell spokesman said.

Originally expected at Interop '93 Fall in San Francisco later this month, the product, which is said to be integrated with the upcoming NMS Version 2.0, is now likely to appear at the NetWorld show in Dallas in October, a Novell spokesman said.

Meanwhile, Network General Corp. last week announced Notebook Sniffer Analyzer, a notebook version of an expert system-based LAN diagnostic tool. The product enables LAN administrators to carry their LAN diagnostic tools in a much lighter-weight box that can also perform regular Windows and DOS applications, a spokesman said. It is due out next month, priced at $9,995.



RECRUITING TALENT FOR BOSTON?

Advertise in the September 20th Eastern Edition when *Computerworld's* regional Careers feature examines "IS Careers in Boston."
Ad Close: September 16th.

800 343-6474 ext. 201

Fibermux Corp. has announced five Token Ring I/O modules that increase user connectivity and the fault tolerance of networks built using Crossbow multi local-area network hubs.

According to the company, the modules consist of two 12-port unshielded and shielded twisted-pair cable modules, an all-fiber module and two mixed-media modules that have 10 ports for user connectivity with fiber-optic ports for backbone connections.

The modules are said to increase network availability and feature state-of-the-art retiming circuitry.

Prices for the modules range from $1,395 to $1,895.

▶ *Fibermux*
21415 Plummer St.
Chatsworth, Calif. 91311
(818) 709-6000

Dayna Communications, Inc. has anoounced TokenPrint and TokenPrint Plus, LocalTalk-to-Token Ring bridges designed to connect LocalTalk printers and other devices directly to Tokeo Ring networks.

Up to two LocalTalk devices can be connected to a Token Ring with TokenPrint, and TokenPrint Plus will connect up to four LocalTalk devices.

Both TokenPrint and TokenPrint Plus have one DB-9 port for Type 1 Token Ring, one RJ-45 port for Type 3 Token Ring and one mini-din 8 LocalTalk port.

All types of LocalTalk devices are supported, with the exceptioo of routers, the company said.

TokenPrint and TokenPrint Plus cost $699 and $899, respectively.

▶ *Dayna Communications*
Sorenson Research Park
849 West Levoy Drive
Salt Lake City, Utah 84123
(801) 269-7394

Farallon Computing, Inc. bas introduced InterRonte/5 and StarRouter, new versions of the company's high-performance LocalTalk-to-Ethernet hardware router/gateway products.

According to the company, InterRoute/5 and StarRouter now support Apple Compnter, Inc.'s AppleTalk Update-based Routing Protocol and Simple Network Management Protocol over AppleTalk, providing osers with products that ease network management and enhance integration in larger networks.

'Other new features inelude flexible seeding options. InterRoute/5 connects as many as four LocalTalk networks to each other and to a backbone or Ethernet network. The StarRouter can connect 12 LocalTalk users to an Ethernet local-area network.

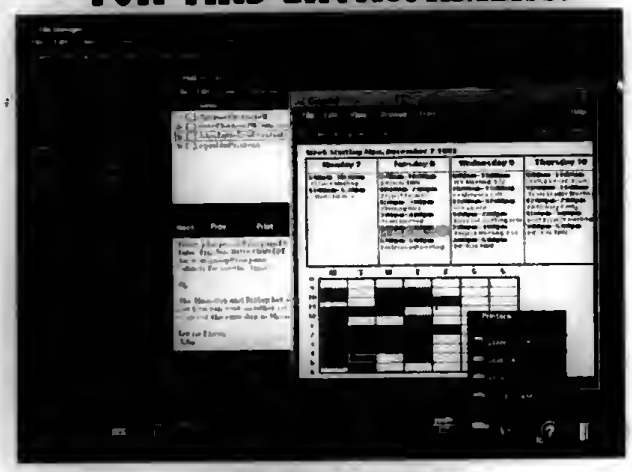
InterRoute/5 costs $3,499, and StarRouter costs $3,299.

▶ *Farallon Computing*
2470 Mariner Square Loop
Alameda, Calif. 94501
(510) 814-5100

Product shorts

OpenConnect Systems, Inc. has introduced the OC/FTP Client and the OC/FTP Server, two turnkey solutions designed for small installations interoperating IBM Applicatioo System/400s with other systems on the Transmission Control Protocol/Internet Protocol enterprise network. Cost: Support for 16 or 32 logical units is provided by the two packages for $5,000 and $6,500, respectively. OpenConnect Systems, Dallas, Texas, (214) 484-5200.... CIS has introduced RoboMon Version 5.1, a product designed for Digital Equipment Corp.'s OpenVMS Automated Operations and Performance Advising & Tuning. According to the company, RoboMon 5.1 provides sites with the abtlity to automate the detection and correction of systemwide and application-specific operational problems. Cost: Prices range from $825 to $20,000. CIS, Newton, Mass., (617) 527-1550.

DEVELOP YOUR GRAPHICAL APPLICATION FOR THIS ENVIRONMENT:



AND HAVE IT RUN HERE, HERE, HERE, HERE, HERE, HERE

HEWLETT PACKARD · IBM · SCO OPEN SYSTEMS SOFTWARE · SunSoft · UNIVEL · UNIX SYSTEM LABORATORIES

...AND OTHERS!

ATTEND THE COMMON DESKTOP ENVIRONMENT DEVELOPERS CONFERENCE

Software Developers: Learn how you can reach new markets and reduce development costs by creating applications for a single environment that is supported by multiple vendors.

MIS: Learn to easily migrate existing in-house applications to the CDE, save money by leveraging development efforts across the entire enterprise, and protect hardware investments.

Everyone: Learn how to develop applications for the Common Desktop Environment *from the engineers who built it.* See demonstrations of CDE technology.

Attendees receive: Free CDE developers kit. A free membership in UniForum. A free Motif full-day tutorial for those who wish to build or enhance their Motif programming skills.

Register now Register before October 1st and save $100 off the $895 conference fee. Call for information on special rates for groups of 3 or more.

Call 1-800-225-4698 NOW to register or for more information.
San Jose Convention Center - October 26 to 28.

COMMON DESKTOP ENVIRONMENT
DEVELOPERS CONFERENCE
A technology of the common open software environment

The official CDE Developers Conference taught by the Experts

COMPUTERWORLD CAREERS ON-LINE 508 879-4700 with your computer/modem

cc:MAIL NOT ONLY DELIVERS MAIL OF ALL SORTS, NOW IT DELIVERS MAIL ALL SORTED.

INTRODUCING cc:MAIL 2.0 FOR WINDOWS.

Now the most popular e-mail in the world, is even more powerful. The new Lotus® ccMail™ lets you manage your mail like you never could before.

THE NEW RULE-BASED ARCHITECTURE CHANGES THE FACE OF E-MAIL FOREVER.

With its powerful rule-based architecture, ccMail 2.0 gives you unlimited flexibility to control your mail. You can designate priority. You can reroute or automatically file incoming messages. And set criteria for handling outgoing messages. ccMail streamlines the way your e-mail works. Which helps you work.

The dialog-driven rules editor lets you customize your mailbox to sort, file and even reroute your mail—automatically

THE WORLD'S SMARTEST E-MAIL IS ALSO THE WORLD'S EASIEST TO USE.

ccMail 2.0 has a new interface that's easier than ever to use, with customizable features like a slider pane interface and smart windows. SmartIcons™ let you move seamlessly into other Lotus applications. Plus powerful search capabilities and a built-in spell check that proofs your document automatically

NOTHING SHOULD STAND BETWEEN YOU AND YOUR MAIL. AND WITH cc:MAIL, NOTHING EVER DOES.

ccMail works across all popular platforms, all hardware and software configurations, all WANs and LANs and e-mail systems. And ccMail has always featured unmatched scalability.

The convenient slider pane interface, similar to the Windows™ File Manager, allows you to organize your mail easily.

ccMail allows you to send text, graphics, files and faxes, effortlessly, to e-mail users everywhere. Even on the road. Add to this ccMail's exceptional ease of installation and maintenance, plus its top-notch security features, and you can see why ccMail is the overwhelming choice of administrators and users alike.

And now, with rule-based architecture, ccMail sets a whole new standard. To learn more, please call **1-800-448-2500** and ask for a free demo disk.

Lotus cc:MAIL E-MAIL FOR WINDOWS

©1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus is a registered trademark and SmartIcons is a trademark of Lotus Development Corporation. ccMail is a trademark of ccMail, Inc., a wholly-owned subsidiary of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation. In Canada, call **1-800-GO-LOTUS**

How To Get T
You Deserve With An
Pixel Perfect

All of a sudden, it seems, management has set its sights on imaging. They now realize that–in banks, insurance companies, hospitals, government agencies and businesses of all kinds–imaging is speeding up the processing of business forms. It's improving document control and customer service, enhancing productivity and making access to volumes of valuable information fast and easy.

Remembering the words "fast" and "easy," management turns to MIS directors and LAN administrators and says, "Get me *that*. Now!"

You know that "that" means workflow software, OCR software, scanners, muscular microprocessors and high-resolution displays, all-points-addressable printers, magnetic and optical storage, plus the LAN-to-LAN horsepower required to move all that valuable information from desk to desk or across the country–now! To say nothing of project management, integration, security, backup and recovery, contingency, migration, multiple concurrent image users, and expansion.

If all that does not add up to "easy," we hope it suggests that you call us "fast." Standing by our phones are the people who know the most about end-to-end imaging solutions–Ameritech Team Data.™ The best brains in the business of moving

ne Recognition
maging Solution That's
End-to-End.

and managing data. They're your contact point for cost-effective, ready-*now* solutions. Which, in this case, include professional services, software, hardware, and high-end data-transport products like Ameritech® FDDI, Ameritech® SMDS and Ameritech® Frame Relay Service with enough bandwidth for instantaneous image response.

We think getting your management the right imaging solution will go a long way toward fulfilling the Ameritech commitment to apply our growing resources to enhance the quality of life, support education and spur economic development for all our customers. If it's time you got the recognition you deserve, make the easy call to Ameritech Team Data. Fast.

Call us first.
1-800-TEAM-DATA

AMERITECH
Your link to a better life.℠

©1993 Ameritech. All Rights Reserved.

Get out of the rough

Give users up to 200 times faster access to DB2® data

Avoid the I/O hazard

Wasting time and resources retrieving data on DASD can become a serious handicap. You need fast access to mission-critical information. And you need it *now*— *without* expensive hardware upgrades.

EXTENDED BUFFER MANAGER (XBM™), new from BMC Software, Inc., delivers the easiest and most cost-effective way to reduce response time. XBM's high-speed, dynamic caching subsystem gives users up to 200 times faster data access. Most I/Os are eliminated, and the time is shortened to reach critical data, including indexes, work files and the DB2 catalog.

XBM helps you determine which objects should be cached and when by offering online and batch I/O information available only through BMC Software products. These data set level statistics can be used for reporting or simulation purposes. Then prioritize your data in the XBM cache. And keep DB2 performance out of the rough.

Proactive performance

EXTENDED BUFFER MANAGER is the newest addition to the integrated ACTIVITY MANAGER performance family for DB2. ACTIVITY MANAGER offers the only proactive approach to DB2 performance management. It includes exclusive interfaces between its three products—XBM, ACTIVITY MONITOR and OPERTUNE®.

Get out of the rough. For a free trial call BMC Software at 713 240-8800 or **1 800 841-2031**

BMC SOFTWARE

The Experience. The Technology. The Future.

BMC Software international offices are located in Australia, Canada, Denmark, France, Germany, Italy, Japan, Netherlands, Spain and the United Kingdom.
BMC Software ® a registered trademark of BMC Software, Inc. DB2 is a registered trademark of IBM Corp. ©1993 BMC Software, Inc. All rights reserved.

IBM Business Partner

IBM software helps mainframes back up non-IBM workstations

By Johanna Ambrosio

■ IBM has introduced a second software package that allows customers to use their mainframe to back up PCs and networks, even those not from IBM.

But there are some differences in the products, namely the platforms they run on and support, and their functionality. The newer of the two, called the Adstar Distributed Storage Manager (ADSM), comes out of IBM's Adstar storage unit. It runs on a range of nonmainframe platforms and allows customers to treat the backup data as they would any mainframe-generated data. In other words, the backup data can be stored on mainframe-attached disk drives for a predetermined time and then moved to tape.

New feature

Customers can also preset backup times, so end users only need to leave their PCs turned on.

The older product, Workstation LAN File Services (WLFS), does not allow for such sophisticated data setup. Introduced by the Enterprise Systems Division that makes mainframes, WLFS provides basic backup in addition to other functions. These include centralized security for the attached workstations and allowing the attached local-area networks to share information by passing it through the mainframe.

Other differences include the platforms the packages run on and support. The older software, WLFS, runs under the IBM VM and MVS systems and supports DOS, OS/2, IBM AIX, Macintosh and Sun Microsystems, Inc.'s SunOS as clients.

The newer package, ADSM, runs under — or will by year's end — MVS, VM, AIX and OS/2 as servers. Clients supported include Novell, Inc. NetWare, AIX, SunOS and Solaris, Windows, OS/2, the Macintosh, DOS and Hewlett-Packard Co.'s HP/UX. The Santa Cruz Operation's SCG version of Unix will be added to the client roster in 1994.

Database support includes Oracle Corp.'s Oracle; Sybase, Inc.'s Sybase; Borland International, Inc.'s Paradox and dBase; and The ASK Group, Inc.'s Ingres, in addition to IBM's own DB2/2 and DB2/6000 systems.

Pricing is also different. WLFS is priced at $250 per attached server per month, whereas ADSM is priced at $420 per month for the server and $5 per month for each attached client.

The data services manager at a large insurance company, who requested anonymity, started using ADSM in May. Eventually, he expects to back up 2,000 OS/2 workstations with the mainframe; he now backs up 24. While things are going well with the product, he said, this process does raise some issues. Among them are performance and the need for additional disk capacity attached to the mainframe to handle the increased volume.

"What happens to the network when we're backing up 2,000 workstations?" he asked. "Especially if we do this during the day, in background mode on the PCs, how will that impact the interactive applications?" He added that one answer to that may be to do backups at night.

Betz Entec takes client/server plunge

By Mark Halper
BORSHAM PA.

In five attempts to jump the 20-foot waterfall near the end of West Virginia's raging Big Sandy River, Betz Entec, Inc. information systems chief Anthony Martin has been tossed from his raft four times.

He said he hopes his success rate is a little higher as he leads his water-treatment chemicals company on a client/server plunge, an adventure he considers riskier than any of his white water undertakings.

"If I miss in the waterfall, I can get physically hurt, but I can't hurt my career," Martin mused in a recent interview at the company's headquarters here.

Martin's ideal rafting technique is not unlike his approach to the client/server implementation: Just as he likes to hit the waterfall with a rush to ensure an intact landing, he is picking up the pace on his efforts to rely less on Betz Entec's central Hewlett-Packard Co. HP 3000 and to push more of the processing on to some 100 Novell, Inc. NetWare connected PCs in Horsham.

While many of the PCs already run the Windows operating environment, about 90% do not yet have Windows applications and are still running mostly under HP 3000 terminal emulation.

Picking up the pace

But an outbreak of populist demand for Windows applications has quickened a three- to five-year conversion schedule into a one- to three-year plan. User hubbub spread after Betz parent Betz Laboratories, Inc. required all human resources users to tie into a Windows-based PeopleSoft, Inc. human resources application. People in other departments wondered why they, too, could not run programs that would cut down on the time they spent communicating with the HP 3000.

"They're tired of having to know seven different ways of accessing information," Martin said. By moving out of terminal emulation and into Windows, they can standardize on the Windows interface, he noted.

To facilitate the switch to client/server operations, Betz

Betz Entec's Anthony Martin *says he hopes his client/server conversion is not as choppy as the Big Sandy River*

Entec is replacing rudimentary terminal emulation software with a combination of Walker Richer & Quinn, Inc. software for emulation and Omnidesk, Inc.'s Omnidex software, which permits multiple access paths to the HP 3000's HP Image SQL database.

Besides heeding the call of the computing masses, Betz Entec has plenty of other reasons to convert to a distributed computing scheme.

As Martin noted, it is much cheaper to develop client/server programs using Microsoft Corp.'s Access database management system than by using expensive fourth-generation language (4GL) tools in an HP 3000 environment.

Martin said this became clear earlier this year when Betz Entec upgraded from an HP 3000 935 to a 957. With that change, 4GL supplier Speedware, Inc. charged an $18,000 upgrade fee and $5,000 extra for maintenance on the more powerful platform. In comparison, Microsoft charged $400 per copy for Access, and Betz Entec needed only six copies.

Betz Entec will also save on hardware upgrade costs, Martin said, because it will have to beef up its HP 3000 less often — every seven or eight years instead of every three or four. Martin has two developers working full-time with Access on PCs, which has lightened the load on the HP 3000.

Still, old habits die hard. While Martin is easing the processing load on the HP 3000, he has no plans to sell it.

IBM shifts service units

By Thomas Hoffman

Earlier this month, IBM quietly transferred its IBM Consulting Group from the company's application solutions unit to IBM North America, the firm's marketing arm. By doing so, Big Blue has effectively brought all three of its services divisions under a single mantle.

The move, according to observers, should eliminate much of the confusion that customers had earlier experienced when dealing with the IBM Consulting Group and Integrated Systems Solutions Corp. (ISSC), IBM's outsourcing unit.

In the past, customers had three avenues into IBM for service: IBM's trading areas, for systems integration; IBM Consulting Group, for management consulting; and ISSC, for outsourcing services. Each of the three divisions regularly submitted bids on the same customer contracts, a process that was often baffling for clients, analysts said.

"It was very confusing for customers," said Julie Schwartz, associate director for professional services at Dataquest Worldwide Services Group in Framingham, Mass.

United front

Schwartz said she believes the new services arrangement will create synergies between the services divisions and will help customers differentiate between the range of services offered by each group. "Now there will be a uniform front to the customer. The idea behind this is that there's more control over setting incentives so the competition [among divisions] doesn't happen," Schwartz said.

IBM, *page 76*

TO TELL A REAL NODE FROM A WANNABE NODE, READ THE LABEL.

INTRODUCING PCs DESIGNED SPECIFICALLY AS NETWORK NODES.

(And you won't pay through the nodes either.)

It's quite simple. If it says Dell NetPlex,™ it's a real node.

Dell's new NetPlex systems are PCs designed from the ground up to be network nodes. The result is a far more cost-efficient node, remarkably free of set-up and maintenance hassles.

Works with your budget as well as with your network.

The cost savings up front are considerable. Our node itself is priced below any comparable PC offered by our competitors. And we save you time and resources by thoroughly testing NetPlex for network compatibility and then factory-installing your choice of six industry-standard network interface cards. We'll also run NIC diagnostics for you. And set jumpers. And install your choice from 100 of the most popular software applications. All this, accomplished with one P.O.

We've also made our NetPlex systems remarkably resistant to future shock. So six months from now when your users are demanding even more power in their computers, our PCs will be happy to accommodate them. All systems can be upgraded using Intel's powerful i486™ Overdrive™ processor. You can expand up to 32MB of memory. Or add a high-speed SRAM cache.

Customized customer service.

With Dell, you can pick and choose from a full menu of service options. We call it our SelectCare™ program. You may prefer the obsessively attentive 4-hour on-site service* option. Or you may elect the highly responsive plan for self-maintainers. Likewise, you may want coverage for 5 years. Or you may settle for just one. The bottom line is, you pay only for the service you want, exactly as you want it. And not a penny for stuff you don't want or need.

When you do call us for technical assistance, you're guaranteed* help within five minutes, 24 hours a day, 7 days a week. Try finding that kind of service anywhere else. And since you deal directly with Dell, you get convenience and responsiveness other PC owners only dream of.

No dummies here.

Let's just get one thing straight here. Because we've made a node doesn't mean we've made any less of a PC. These are true high-performance business machines. Comparable to any of our major competitors' offerings. With block mode IDE transfer that makes for a veritable data rocket. And with local bus video performance that's on perpetual fast-forward.

What about reliability, you ask. Well, we've received top ratings in polls by both Dataquest** and Reliability Ratings.† And we've won virtually every major customer satisfaction poll we've participated in over the last five years.

So call Dell and get yourself a real node. Not just some PC masquerading as a node.

DELL NETPLEX.
PCs DESIGNED SPECIFICALLY AS NETWORK NODES.

DELL™

TO ORDER, CALL

800-545-1567

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA, CALL 800-668-3021 IN MEXICO CITY, 228-7811. #11H107

intel inside

†Survey was independently conducted by Reliability Ratings, Needham MA. The data is quoted from a 40-page report available for purchase through Reliability Ratings (617) 444-5755. Reliability Ratings, the research company, is not affiliated with Dell Computer Corporation and does not endorse its products. *Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax™ line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees. **Source: Dataquest, Inc. Nov. 1992 *On-site service provided by BancTec Service Corporation. On-site service may not be available in certain remote areas. The Intel Inside logo is a registered trademark and i486 and Overdrive are trademarks of Intel Corporation. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

DEC readies storage array controller

By Craig Stedman
MAYNARD, MASS.

Digital Equipment Corp.'s recent introduction of a new storage array controller for connecting Small Computer Systems Interface-2 peripheral devices to OpenVMS-based VAX and Alpha AXP clusters drew mostly favorable notices from users for bringing DEC more up to date in the high-end storage market.

The HSJ40 is due to ship in late September along with six new StorageWorks subsystems. While the first version does not match the raw I/O throughput of DEC's earlier HSC controllers, the company said it costs much less, particularly for purchases of 50G bytes or more.

Customers have "perceived us as expensive when they wanted to add a lot of storage," acknowledged Bruce Baird, StorageWorks product marketing manager. But the cost of a 76G-byte setup is $2.08 per gigabyte with the HSJ40, down from $4.73 per gigabyte using an HSC unit, he said.

Attention-grabber

The promised price break caught the eye of George Reid, MIS director at Sanford C. Bernstein & Co. in New York. He considered shifting to solid-state storage for some of his VAX-driven database applications but said the HSJ40 "could allow us to do it in a much more cost-effective manner."

The HSJ40's support for redundant arrays of inexpensive disks (RAID) technology and the modular approach DEC is taking with StorageWorks are appealing, Reid added.

"This is the kind of packaging DEC should have been doing the last 10 years and didn't," he said.

Reid said he expects to buy HSJ40-equipped subsystems late this year. Frank Brake, director of international operations for technology business development at Newport News Shipbuilding and Drydock Co. in Newport News, Va., said he also will likely purchase some over time.

However, PacifiCare Health Systems, Inc. in Cypress, Calif., chose rival MTI's FailSafe RAID subsystem in a recent buy.

At the controls

Features of DEC's new HSJ40 storage array controller for OpenVMS clusters

Capacity
- Handles up to 36 SCSI-2 disk drives via six separate SCSI-2 buses.
- Maximum of 76G bytes, using DEC's 2.2G-byte, 3 1/2-in. drive.

Supports
- VAX and Alpha AXP clusters using DEC'S CI interconnect.

Performance
- 1,100 I/O requests per second (2,200 for dual-redundant configurations).
- 4M byte/sec. bandwidth per controller.

RAID capabilities
- RAID-0 and RAID-1 supported; RAID-3 and RAID-5 planned.

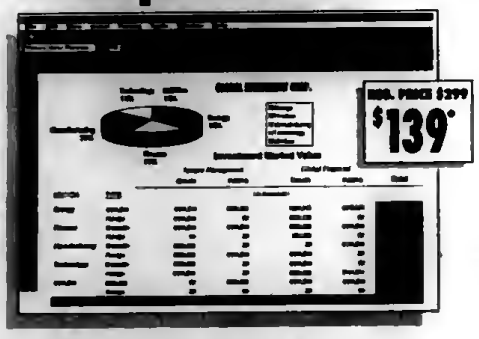
Pricing and availability
- $28,900; late September.

One shortcoming of StorageWorks is its lack of support for non-DEC disk drives, said Matt Holdrege, senior network specialist at PacifiCare.

Baird said DEC's storage business unit plans to add support for third-party drives as part of its long-term StorageWorks strategy. However, he added that he has "not seen a timeline for accomplishing that."

The StorageWorks strategy appears sound, and DEC's pricing is "very competitive," said Dennis Waid, president of Peripheral Research Corp., a market research firm in Santa Barbara, Calif.

ReportSmith



As Serious As You Are About Reporting

ReportSmith is the client/server query and reporting product with all the power you need to build sophisticated reporting applications. And the ease of use you need to put reporting into the hands of your end users.

"ReportSmith produces stunning reports from your database files interactively, using a WYSIWYG approach to report formatting that makes designing a layout a simple point-and-click experience."
- PC Magazine

ReportSmith offers a unique visual layout approach for building columnar, form or crosstab reports interactively on the screen with live data. And extensive formatting capabilities including charts, fonts, color, and images.

If you know Windows, you know ReportSmith. Save time coming up to speed with ReportSmith's standard Windows user interface— and move ahead of the pack with OLE, DDE and ODBC.

A powerful crosstab facility makes tasks such as standard financial reports a snap. Point and click to define a complex matrix report.

Customize or extend reporting applications and access DLLs with ReportBasic, a Visual BASIC-like macro language. Seamlessly integrate with PowerBuilder, SQLWindows, Uniface, Visual BASIC and other application building tools.

EXPERTS' Windows PICK

One product, one price. No need to buy different versions of ReportSmith for different databases.

Building a set of reports for wide distribution? Free runtime is included.

*All for a rather amazing limited-time price of $139 for your first copy.

Call Today! 1-800-446-3446 ext. 300

REPORTSMITH

ReportSmith is ODBC compliant and supports native connections for Sybase, SQL Server, ORACLE versions 6 and 7 DB2 (through MDI, Omni SQL and Gupta gateways), Teradata (through MDI gateway), Gupta, and Ingres. ODBC drivers for dBASE, Paradox, Btrieve, Access, FoxPro and Excel are included.

All registered and unregistered trademarks mentioned on this ad are the sole property of their respective owners.

Indigo Software Corporation
2755 Campus Drive, Suite 205
San Mateo, CA 94403 · 415-312-0770

EMC Harmonix keeps on growin'

By Stephen P. Klett Jr.

Adding fuel to the debate over which storage method provides the best bang for the buck in the Application System/400 market, EMC Corp. in Hopkinton, Mass., recently unveiled new additions to its Harmonix series of direct-access storage device products aimed at bringing AS/400 shops into the mirroring fold.

EMC took the wraps off two new models — the entry-level HX3C and high-availability HX3HA — and expanded the cache capacity of its flagship HX3 product to 256K bytes of write cache and 512M bytes of read cache. The line offers 1.7G to 6.8G bytes of storage capacity, transaction speeds averaging 5msec. to 10 msec. and board-level upgradability. Prices range from $25,000 to $73,000.

The Harmonix line is based on mirroring technology, or redundant arrays of inexpensive disks (RAID)-1.

Reluctance for RAID

While mirroring offers the highest level of data protection, users have been reluctant to commit to it because of its high cost. RAID-5 is being pushed as a happy medium, giving users a similar level of data protection at a lower price, although at a slight performance trade-off.

EMC claims the HX3HA's price point, which ranges from $47,000 to $73,000, positions it to compete directly against RAID-5 products such as IBM's 9337 storage subsystem. And users, including true-Blue shops, appear to be listening.

For example, Chelsea Community Hospital, a longtime all-IBM customer in Chelsea, Mich., is beta testing the HX3HA. While the system has only been installed for a few weeks, the 37-bed rural hospital plans to replace all of its IBM disks with EMC equipment, according to Jim Davis, assistant director of information systems.

While Davis was impressed by the price/performance level of the HX3HA, he said it was EMC's service and support that was the primary differentiator.

"We can't get IBM to respond to us since it's bad troubles," Davis said. "All the people we dealt with in the area have been laid off." Davis acknowledged that Chelsea Community Hospital is a small customer site with two AS/400s and roughly 125 PCs and that IBM "is in a state of flux and it's easy for people to drop through the cracks."

EMC offers Harmonix customers a service option called the Remote Maintenance Program, which enables it to monitor the performance and threshold levels of customers' systems from its headquarters. Every HX3 product can be configured with the service at prices starting at $3,000 for up to eight ports.

LAN READY, SET, GO.

It can, shall we say, take a little, uh, extra time to, you know, get your typical PC on the, uh, network.

Well, Dell's new NetPlex™ systems are not typical PCs. They're true high-performance machines that are also network nodes through and through.

SET-UP TIME OF A DELL NODE*	
Open System Chassis	N/A
Install NIC	Done by Dell
Configure NIC	1 Minute
Run Diagnostics on NIC	Done by Dell
Other Software Configuring	3 Minutes
Close System Chassis	N/A
	4 MINUTES

Designed to be up and running on your network in five minutes or less.

Just ask, and we'll gladly take care of the more monotonous, time-consuming set-up chores for you. Like factory-installing network interface cards. Running NIC diagnostics. Installing your software. And setting jumpers.

We even made it easier to access your system set-up utilities — with a simple CTRL-ALT-ENTER. Rather than the yawn-inducing process of rebooting your system to load the system set-up from a diskette.

So give us a call to order your nodes. Or, uh, who knows, uh, what you may have to, uh, go through?

LAN READY, UH, UH, UH, SET, UH, UH, UH, WAIT A SECOND, UH, GO.

DELL NETPLEX.
PCs DESIGNED SPECIFICALLY AS NETWORK NODES.

DELL™

TO ORDER, CALL
800-348-8351

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA, CALL 800-668-3021 IN MEXICO CITY, 228-7811 #11HD8

*Set-up time represents network set-up only. Tasks were performed by a Dell Network Support Engineer. The Intel Inside logo is a registered trademark of Intel Corporation. Dell disclaims proprietary interest in the marks and names of others.

©1993 Dell Computer Corporation. All rights reserved.

intel inside

IBM services

CONTINUED FROM PAGE 71

IBM's services shift, announced internally to employees earlier this month, includes the creation of IBM Business Transformation Services, North America. The new unit represents an expansion of business process re-engineering services that had been offered by the IBM Consulting Group, according to Sam Albert, an independent consultant in Scarsdale, N.Y.

Albert said the re-engineering unit is taking a "mass customization" approach with its customers or "crafting and customizing enterprise solutions for each individual customer," Albert said.

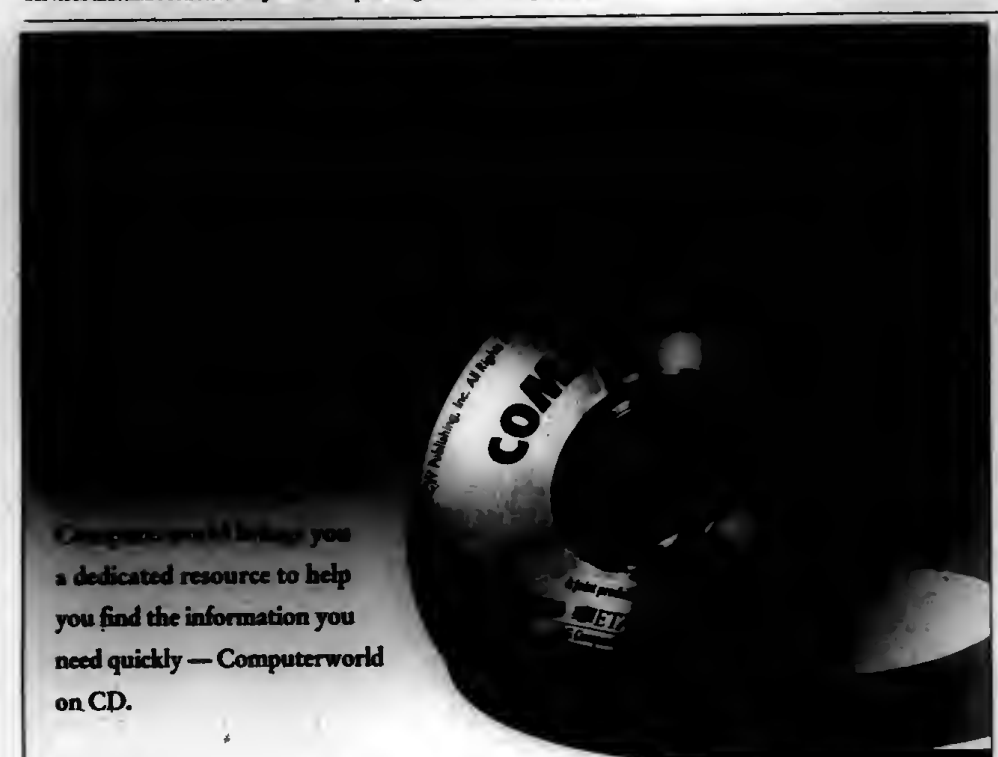
In the market

In addition, the IBM Consulting Group is planning to add banking, health care, insurance and other industry professionals to its ranks to provide customers with additional expertise in their specific markets, Albert said.

A spokesman for IBM would not directly confirm those reports but added, "IBM has been clear in the fact that we intend to expand our expertise in specific industries."

Other markets that the IBM Consulting Group caters to include telecommunications, retail, manufacturing, transportation and utilities. By forging closer ties with IBM's marketing arm, the consulting group should gain further knowledge of its clients' industries, analysts said.

Although the IBM Consulting Group now reports to IBM North America, the reporting structure has not changed for consultants working abroad. Consultants in Europe and Asia will continue to report to their regional units and will send "dotted-line" reports to the IBM Consulting Group in the U.S.



Computerworld on CD brings you a dedicated resource to help you find the information you need quickly — Computerworld on CD.

With this valuable resource tool you can:

- Find product and vendor company information quickly.
- Stay on top of strategic industry directions.
- Follow critical technology trends.
- Analyze top company IS profiles and compare with yours.
- Execute key word searches on any topic within seconds.
- Eliminate mass paper storage.

Your subscription to Computerworld on CD includes:

- Over four years worth of full text articles from Computerworld.
- Selected graphics from each issue showing industry trends, product comparisons and more.
- Articles from Computerworld's annual Premier 100 and Computer Careers magazines.
- Detailed information from the Premier 100 database — total score, profit growth, IS budget, company highlights and more.
- Plus a new bonus feature — over five years worth of articles from the Journal of Information Systems Education, published by DPMA EDSIG.

Save $100 on charter subscription offer.

Become a charter subscriber for just $295 and save $100 off the regular annual price of $395. This offer is available for a limited time only, so act now.

Your annual subscription includes four discs updated quarterly.

A special Sony Multimedia Player bundle offer:

The ultimate in portability! Access Computerworld on CD anywhere, anytime with Sony's Multimedia CD-ROM Player (featuring CD music playback capability). Specially packaged price is just $1195.

Now with multi-platform capability.

Computerworld on CD operates on a PC (DOS and OS/2) Mac, and in a Windows environment. Computerworld on CD also runs on the Sony Multimedia CD-ROM Player.

What users like about Computerworld on CD:

"It can look up products and company names... indispensable."

"...finds product information and client information quickly."

"...full base text, good graphical start for each article."

"Can search across multiple issues and find the thing I'm looking for. Makes life easier."

"The sheer volume of what's in it. Easy access without having to go to a library service."

"It has information not found on Computer Select."

Source: Survey of Computerworld on CD subscribers, May 1993.

For more information or to order call:
(800) 285-3821
Outside of the U.S. call: (508) 879-0006

COMPUTERWORLD
The Newspaper of IS

a publication of IDG

All trademarks are property of their respective owners. CD/8-16

Briefs

Oracle tops Unix market

Oracle Corp. leads the Unix relational database market with 44% of 1992's $2 billion in worldwide sales, according to market research firm International Data Corp. (IDC) in Framingham, Mass. Informix Software, Inc. was next in line with 18%, followed by Sybase, Inc. with 12% and The ASK Group, Inc.'s Ingres Products Division with 9%, IDC said.

Norwest buys NCR system

Norwest Bank Minnesota, N.A. has purchased NCR Corp. image-based item processing systems for its wholesale lockbox processing operations in Minneapolis. Terms of the agreement were not disclosed.

VMark to port PI/Open

VMark Software, Inc. has agreed to port its PI/Open database management system to Digital Equipment Corp.'s Alpha AXP systems and the DEC OSF/1 operating system. DEC will make VMark's DBMS products available through DEC sales channels, the firms said.

ProSMS gets IBM support

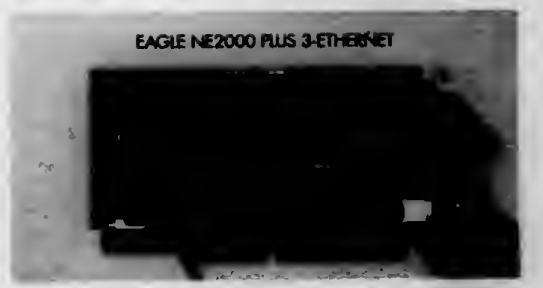
Boole & Babbage, Inc. recently said its ProSMS suite of storage management products will be supported by IBM in terms of on-site services for implementing IBM's Data Facility Storage Management Subsystem (DFSMS) platform. The ProSMS products are tools designed for planning and performing DFSMS conversions and monitoring and controlling storage subsystems.

SAVE MONEY RECRUITING STAFF

Advertise in Computerworld's regional Careers pages. They work.

800-343-6474 x201

WELCOME TO THE LAN OF OPPORTUNITY.



NETWORK INTERFACE CARDS

3 COM ETHERLINK III 3C509-TPO	$124	3 COM ETHERLINK III 3C509 COAX	$124
ACCTON ETHERNET COMBO	$84	IBM 16/4 TOKEN RING	$465
SMC ETHERCARD PLUS ELITE 16 COMBO	$134	EAGLE NE2000 PLUS 3-ETHERNET	$124

FOR THE PRICES LISTED ABOVE, WE'LL INSTALL THE CARD, RUN THE DIAGNOSTICS, AND EVEN SET THE JUMPERS SO YOUR NODE IS READY TO GO.

God bless America. Where else could you find a PC maker that delivers your PC with your choice of six different factory-installed network interface cards? Each one factory-tested and validated for interoperability with the most popular NetWare® operating systems and topologies.

We're talking about Dell here, of course. Not one of those companies that offers you one take-it-or-leave-it proprietary card which may or may not be compatible with your network's wiring. A card which will, nonetheless, cost you as much or more than the cards Dell offers.

It's this level of attention to detail that makes Dell's NetPlex™ systems PCs that truly earn the right to be called nodes. They've been designed from the ground up to work on your network. With great care taken to see that you avoid the usual hassling and tweaking.

Call us to order your Dell NetPlex systems. You won't find an opportunity like this anywhere else.

Look for the Intel Inside® symbol on our quality computer systems.

DELL NETPLEX. PCs DESIGNED SPECIFICALLY AS NETWORK NODES.

DELL

TO ORDER, CALL

800-247-4739

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA: CALL 800-668-3021 IN MEXICO CITY: 228-7811 #11HD9

*Prices valid in U.S. only. Some products and promotions not available in Canada or Mexico. The Intel Inside logo is a registered trademark of Intel Corporation. NetWare is a registered trademark of Novell, Inc. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

[redacted]

Software

Ross Systems, Inc. has announced the Human Resource CS Series, a client/server-based system designed for complex human resources and payroll departments.

According to the company, the Human Resource CS Series provides split processing and supports a mixture of client programs. Optional capabilities include laser check-printing features, payroll tax filing, imaging and a 24-hour benefit hot line for employee inquiries.

The company also offers Macintosh, Motif and Windows implementations with the same native look and feel and application features for each graphical user interface.

User-based prices for the series start at $35,000 per module.

▶ *Ross Systems*
555 Twin Dolphin Drive
Redwood City, Calif. 94065
(415) 593-2500

BMC Software, Inc. has announced Ultraopt/IMS, a product designed to improve response times and increase IMS message throughput by reducing the size of data streams and redirecting congested message traffic.

According to the company, Ultraopt/IMS reduces the length of outbound data streams by 50% to 85% and inbound streams by 40% to 90%. IMS throughput can be increased by up to 20% by redirecting message traffic from an overloaded Task Control Block to Service Request Blocks, the company said.

The product works transparently to the user and does not require any modifications to VTAM or other system components.

The need to install an optimization product for each IMS subsystem is eliminated because Ultraopt/IMS installs once per CPU and works for all IMS control regions at the same time, the company reported.

A perpetual license of Ultraopt/IMS costs $46,000.

▶ *BMC Software*
1 Sugar Creek Center Blvd.
Sugar Land, Texas 77487
(713) 240-8800

BlueLine Software, Inc. has added support for Novell, Inc.'s NetWare HostPrint to its Multiprint/VM print routing software.

Multiprint/VM was designed to permit organizations using the IBM VM operating system to print mainframe output on local-area network printers without adding hardware or software.

The company said the product can access any printer enterprisewide with support for HostPrint running under NetWare for SAA. Printing options now include Epson America, Inc.'s dot-matrix printers, Hewlett-Packard Co.'s LaserJet printers, ASCII printers and other LAN-compatible hardware.

A permanent license for Multiprint/VM ranges from $7,500 to $14,350.

▶ *BlueLine Software*
Suite 690
5775 Wayzata Blvd.
Minneapolis, Minn. 55416
(612) 542-1072

Hardware

XL/Datacomp, Inc. has introduced the Nearline ACS 9709 ½-in. square tape Automated Cartridge System.

The product works in conjunction with the company's Nearline DMS Data Management Software and Nearline LCU 9701 Library Control Unit, which make up XL/Datacomp's Nearline ½-in. tape library system.

The ACS 9709 stores up to 86G bytes of uncompressed or 256G bytes of compressed data on a maximum of 288 extended-length, ½-in. tape cartridges, the company said.

An automated robotic device, a rotational eight-sided carousel with three magazines per side and a bar-code reader are included.

Pricing for the Nearline ½-in. tape library system starts at $108,825.

▶ *XL/Datacomp*
908 North Elm St.
Hinsdale, Ill. 60521
(708) 323-1200

Computer Power, Inc. has announced the Computersave Mark II Uninterruptible Power System.

The product offers a Novell, Inc.-approved file server interface and includes features such as complete power line conditioning, 92% efficiency, 150% overload capacity and a two-year electronics warranty.

RS-232 communications power, extended runtimes of up to eight hours and rack-mount configurations are options. Capacities range from 900VA to 19kVA, the company said.

Prices begin at $1,600.

▶ *Computer Power*
124 W. Main St.
High Bridge, N.J. 08829
(908) 638-8000

Acknowledge, Inc. has announced a tape backup option for its Alice family of on-line direct attach optical storage products.

According to the company, the Optical Backup Solution uses either a single or dual high-density helical scan drive embedded in the optical controller. Each cartridge can house at least 10G bytes with Improved Data Recording Capabilities data compression.

Users can back up one optical platter or a complete optical library. Because it is performed off-line, backing up a 20G-byte jukebox with rewritable media takes one-tenth the time of going through IBM's Application System/400, the company said.

Support for off-line tape operations for IBM 3995 libraries is provided.

A single-drive, 10G-byte unit costs $8,350. A dual-drive 20G-byte drive costs $12,750.

▶ *Acknowledge*
251 West Central St.
Natick, Mass. 01760
(508) 650-3630

On-Line Power, Inc. has introduced the Power-Reg line of three-phase power conditioners.

According to the company, the Power-Reg line provides protection against common mode and normal mode noise, single-point grounding and complete isolation.

A Regulation/Isolation Only switch is featured that permits the unit to be operated in either mode. Twelve models are provided with power ratings from 15kVA to 300kVA.

Prices range from $8,000 (15kVA) to $43,000 (300kVA).

▶ *On-Line Power*
5701 Smithway St.
Commerce, Calif. 90040
(213) 721-5017

Now Includes IMS, DB2 SQL, Graphical JCL Analysis

Listen to people who are maintaining your COBOL programs and you'll probably hear a choice word or two. You may be tempted to use the same kind of language when you find out how far behind schedule and over budget your maintenance programmers are.

Now you can clean up their language and get them back on schedule with Revolve. Revolve is a powerful new analysis tool that answers the tough questions about your system. It can literally save days on every software analysis task.

Revolve's unique query capability helps your programmers find quick answers to complex questions. You'll not only accomplish more with fewer people, you'll significantly reduce production problems. And if you think that will make you happy, just imagine what it will do for your programmers and your users.

If your data center meets a few simple qualifications, we'll give you a copy of Revolve. Free. Forever. This is not a "trial offer."

We're betting that after you've seen the difference Revolve can make, you'll say Yesss! to a few more copies.

For your free copy of Revolve, call 1-800-849-BURL today.

"*#+@*!"

"YESSS!"

REVOLVE™ CLEANS UP THE LANGUAGE YOUR MAINTENANCE PROGRAMMERS USE.

BURL SOFTWARE

7200 Falls of the Neuse Road, Raleigh, NC 27615, Fax 919-870-5789

GET A DELL NODE FOR LESS THAN THE TYPICAL PSEUDO-QUASI-WANNABE-NEAR-NODE.

DELL® NETPLEX™ 425s/P
i486™ SX 25MHz SYSTEM

$1,299

- **BUSINESS LEASE*: $48/MO.**
- 4MB RAM
- 32MB MAX RAM
- 120MB (17ms) HARD DRIVE
- 3 ISA EXPANSION SLOTS AVAILABLE
- LOCAL BUS VIDEO
- 512KB VIDEO RAM
- SVGA 1024I MONITOR (14", 1024 x 768, .28mm)
- ONE DISKETTE DRIVE (3.5" OR 5.25")
- SPACESAVER KEYBOARD
- MS-DOS® 6.0/MICROSOFT® WINDOWS™ 3.1/MOUSE

Add an SMC Ethercard Plus Elite 16 Combo Card for only $134 more, or choose from five other network interface cards.

DELL NETPLEX 433s/P
i486 SX 33MHz SYSTEM

$1,549

- **BUSINESS LEASE: $57/MO.**
- 4MB RAM
- 32MB MAX RAM
- 170MB (17ms) HARD DRIVE
- 3 ISA EXPANSION SLOTS AVAILABLE
- LOCAL BUS VIDEO
- 512KB VIDEO RAM
- SVGA 1024I MONITOR (14", 1024 x 768, .28mm)
- ONE DISKETTE DRIVE (3.5" OR 5.25")
- SPACESAVER KEYBOARD
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

Add a 3 COM Etherlink III 3C509 (TPO or COAX) for only $124 more, or choose from five other network interface cards.

DELL NETPLEX 433/P
i486 DX 33MHz SYSTEM

$1,799

- **BUSINESS LEASE: $67/MO.**
- 4MB RAM
- 32MB MAX RAM
- 170MB (17ms) HARD DRIVE
- 3 ISA EXPANSION SLOTS AVAILABLE
- LOCAL BUS VIDEO
- 512KB VIDEO RAM
- ULTRASCAN™ 14C MONITOR (14", 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE (3.5" OR 5.25")
- SPACESAVER KEYBOARD
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

Add an IBM 16/4 Token Ring Card for $465 more, or choose from five other network interface cards.

And here they are. Honest-to-goodness, through-and-through, from-the-bottom-up network nodes. Real node's nodes. Dell nodes.

Every node is thoroughly factory tested and guarantees* compatibility with all the most commonly used NetWare® operating systems and network topologies.

DELL NETPLEX.
PCs DESIGNED SPECIFICALLY AS NETWORK NODES.

DELL

TO ORDER, CALL
800-232-2033

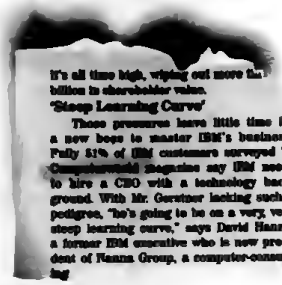
HOURS MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA* CALL 800-668-3021 IN MEXICO CITY,* 228-7811 #11ME1

And though these node systems represent a major breakthrough for network managers, you'd never know it by the price.

So call and get yourself a great node. And not some pretender.

intel inside

*Guarantees available in the USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax™ line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees. *Prices valid in the U.S. only. Some products and promotions not available in Canada or Mexico. †Leasing arranged by Leasing Group, Inc. The Intel Inside logo is a registered trademark and i486 is a trademark of Intel Corporation. MS-DOS and Microsoft are registered trademarks and Windows is a trademark of Microsoft Corporation. NetWare is a registered trademark of Novell, Inc. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

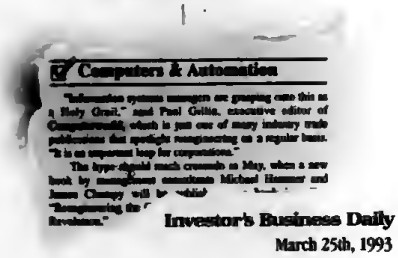


It's all time high, wiping out more th... billion in shareholder value.

'Steep Learning Curve'

Those pressures leave little time for a new boss to master IBM's business. Fully 51% of IBM customers surveyed by Computerworld magazine say IBM needs to hire a CEO with a technology background. With Mr. Gerstner lacking such a pedigree, "he's going to be on a very, very steep learning curve," says David Hanna, a former IBM executive who is now president of Hanna Group, a computer-consulting

THE WALL STREET JOURNAL.
March 25th, 1993

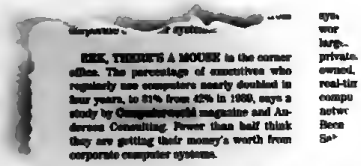


Computers & Automation

"Information systems managers are grasping onto this as a Holy Grail," said Paul Gillin, executive editor of Computerworld, which is just one of many industry trade publications that spotlight reengineering on a regular basis. "It is an important leap for corporations."

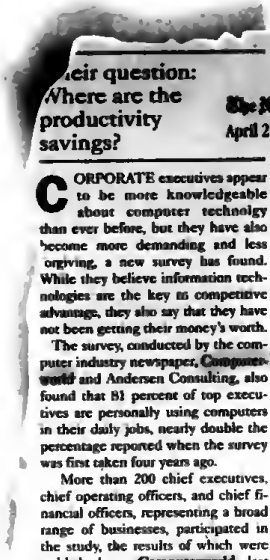
The hype should reach crescendo in May, when a new book by management consultants Michael Hammer and James Champy will be published ... "Reengineering the ... Revolution."

Investor's Business Daily
March 25th, 1993



EEK, THERE'S A MOUSE in the corner office. The percentage of executives who regularly use computers nearly doubled in four years, to 81% from 42% in 1989, says a study by Computerworld magazine and Andersen Consulting. Fewer than half think they are getting their money's worth from corporate computer systems.

THE WALL STREET JOURNAL
April 20th, 1993



...eir question: Where are the productivity savings?

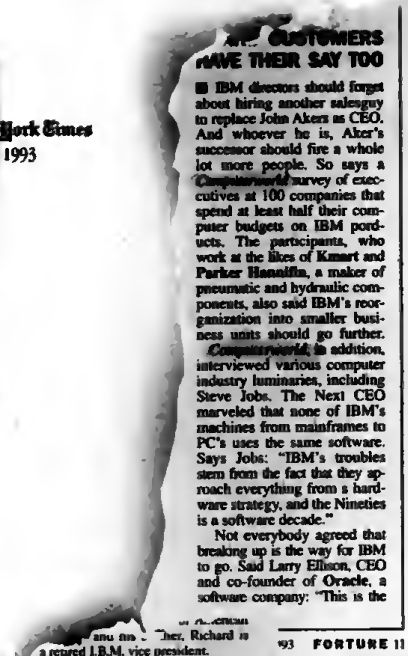
The New York Times
April 25th, 1993

CORPORATE executives appear to be more knowledgeable about computer technolgy than ever before, but they have also become more demanding and less forgiving, a new survey has found. While they believe information technologies are the key to competitive advantage, they also say that they have not been getting their money's worth.

The survey, conducted by the computer industry newspaper, Computerworld and Andersen Consulting, also found that 81 percent of top executives are personally using computers in their daily jobs, nearly double the percentage reported when the survey was first taken four years ago.

More than 200 chief executives, chief operating officers, and chief financial officers, representing a broad range of businesses, participated in the study, the results of which were published in Computerworld last week. Annual company sales ranged from $250 million to $20 billion.

The New York Times
March 25th, 1993



...CUSTOMERS HAVE THEIR SAY TOO

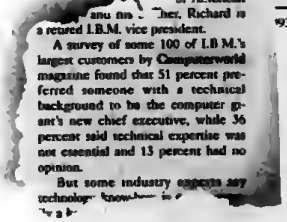
IBM directors should forget about hiring another salesguy to replace John Akers as CEO. And whoever he is, Aker's successor should fire a whole lot more people. So says a Computerworld survey of executives at 100 companies that spend at least half their computer budgets on IBM porducts. The participants, who work at the likes of Kmart and Parker Hannifin, a maker of pneumatic and hydraulic components, also said IBM's reorganization into smaller business units should go further.

Computerworld, in addition, interviewed various computer industry luminaries, including Steve Jobs. The Next CEO marveled that none of IBM's machines from mainframes to PC's uses the same software. Says Jobs: "IBM's troubles stem from the fact that they aproach everything from a hardware strategy, and the Nineties is a software decade."

Not everybody agreed that breaking up is the way for IBM to go. Said Larry Ellison, CEO and co-founder of Oracle, a software company: "This is the

...93 FORTUNE 11

FORTUNE
April 5th, 1993



... and his ... her, Richard is a retired I.B.M. vice president.

A survey of some 100 of I.B.M.'s largest customers by Computerworld magazine found that 51 percent preferred someone with a technical background to be the computer giant's new chief executive, while 36 percent said technical expertise was not essential and 13 percent had no opinion.

But some industry experts say technology know-how is ...

Get the IS news before it's business news in COMPUTERWORLD.

Why not do what the nation's leading business publications do when they want the latest news in IS. Go to the source — COMPUTERWORLD.

Week in and week out, 58 reporters, writers, and designers work around the clock to bring you the latest breaking news from all over the world.

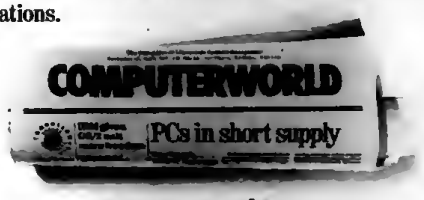
No other newspaper covers the who, what, when, why, and how of IS in greater depth than COMPUTERWORLD. You'll find stories on everything from right-sizing to reengineering, communications to client/server computing, network management to new technology.

It's no wonder our professional peers named COMPUTERWORLD the "Best Computer Newspaper" at the Eighth Annual Computer Press Awards. And it's no wonder over 138,000 IS professionals pay to subscribe to COMPUTERWORLD every week. Shouldn't you?

Order COMPUTERWORLD and you'll receive 51 information-packed issues. Plus, you'll get our special bonus publication, *The Premier 100,* an annual profile of the leading companies using information systems technology.

Call us toll-free at **1-800-343-6474.** Or use the postage-paid subscription card bound into this issue to order your own copy of COMPUTERWORLD.

Then you'll have all the news you need to get ahead in IS — even before it appears in the nation's top business publications.



The Newspaper of IS

More Application Development!

51 Issues for ~~$48~~ Now Only $42.95

Yes, I went more. I accept your offer of $42.95* for 51 weekly issues.
Thet's e savings of over $5.00 off the basic subscription rate.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic Rate: $48 per year

* U S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295.
Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. BUSINESS/INDUSTRY (Circle one)
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medical/Law/Education
40 Wholesale/Retail/Trade
50 Business Service (except DP)
60 Government - State/Federal/Local
65 Communications Systems/Public Utilities/Transportation
70 Mining/Construction/Petroleum/Refining/Agriculture
80 Manufacturer of Computers, Computer-Related Systems or Peripherals
85 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90 Computer/Peripheral Dealer/Dist./Retailer
95 Other_____
(Please Specify)

2. TITLE/FUNCTION (Circle one)
IS/MIS/DP MANAGEMENT
19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
21 Dir./Mgr. MIS Services, Information Center
22 Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele Comm, Network Sys. Mgr., LAN Mgr., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31 Programming Management, Software Developers
41 Engineering, Scientific R&D, Tech. Mgr.
60 Sys. Integrators/VARs/ Consulting Mgt.

CORPORATE MANAGEMENT
11 President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13 Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
51 Sales & Mktg. Management
70 Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
80 Educator, Journalists, Librarians, Students
90 Other Titled Personnel

3. Are you involved in the purchase or use of the following (Circle all that apply)
a. Networking/Communication Equipment
b. PCs/Workstations
c. Large Scale/Midrange Systems
d. Software
e. Peripherals

E4333-0

More Enterprise Networking!

51 Issues for ~~$48~~ Now Only $42.95

Yes, I want more. I accept your offer of $42.95* for 51 weekly issues.
That's a savings of over $5.00 off the basic subscription rate.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic Rate. $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295
Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. BUSINESS/INDUSTRY (Circle one)
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medical/Law/Education
40 Wholesale/Retail/Trade
50 Business Service (except DP)
60 Government - State/Federal/Local
65 Communications Systems/Public Utilities/Transportation
70 Mining/Construction/Petroleum/Refining/Agriculture
80 Manufacturer of Computers, Computer-Related Systems or Peripherals
85 System Integrators, VARs Computer Service Bureaus, Software Planning & Consulting Services
90 Computer/Peripheral Dealer/Dist./Retailer
95 Other_____
(Please Specify)

2. TITLE/FUNCTION (Circle one)
IS/MIS/DP MANAGEMENT
19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
21 Dir./Mgr. MIS Services, Information Center
22 Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele Comm, Network Sys. Mgr., LAN Mgr., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31 Programming Management, Software Developers
41 Engineering, Scientific, R&D, Tech. Mgr.
60 Sys. Integrators/VARs/ Consulting Mgt.

CORPORATE MANAGEMENT
11 President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13 Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
51 Sales & Mktg. Management
70 Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
80 Educator, Journalists, Librarians, Students
90 Other Titled Personnel

3. Are you involved in the purchase or use of the following. (Circle all that apply)
a. Networking/Communication Equipment
b. PCs/Workstations
c. Large Scale/Midrange Systems
d. Software
e. Peripherals

E4333-0

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

Application Development

Taking a byte out of crime

Phoenix police use CASE, other tools to speed work

By Thomas Hoffman
PHOENIX

The City of Phoenix Police Department needed a break in its pursuit of the elusive Yogurt Bandit, an unidentified suspect authorities had linked to 15 robberies of yogurt shops, convenience stores and banks over a three-month period in 1990.

Some savvy detective work and helpful automation gave them that break and led to an arrest. Using a Field Interrogation (FI) database, a Phoenix detective matched the description of a person seen in the area with a description of the Yogurt Bandit. The vehicle license plate of the suspect matched a partial plate number that witnesses had given police.

After searching through apartment complex parking lots in the identified area, the detective found a car that nearly matched the witnesses' descriptions. Police staked ont tbe parking lot until tbe culprit walked into their trap.

Fast-paced tracking

The detective who tracked down the Yogurt Bandit nsed a system called PACE, or Police Automated Computer Entry, which was developed using Unisys Corp.'s LINC II computer-aided software engineering software. It includes the FI subsystem, a database that stores data from the reports patrol officers file when they question someone who is acting suspiciously bnt is not arrested.

The PACE system has provided the police department with benefits beyond those seen by tbe detectives. For example, reports were once bandwritten by the department's 2,100 officers and usually took 45 minntes to complete. Now officers telepbone information to data entry clerks who enter the information on Unisys CTOS workstations and complete the reports within 20 minntes. Moreover, the PACE application, powered by a Unisys A15 mainframe, prompts the data entry clerk to ask the reporting officer for additional information if needed.

The system, developed during an 18-month

Byte, *page 82*

The city in the desert *could see a 20% rise in police reports by 1997, which Michael Barry will help the Phoenix Police Department handle with computers*

PowerBuilder 3.0 gets the nod

By Melinda-Carol Ballou
BURLINGTON, MASS

Beta-test users and consultants familiar with Version 3.0 of Powersoft Corp.'s PowerBuilder, which is slated to ship next month, gave the new release high marks in comparison with Version 2.0.

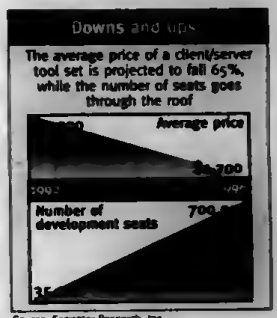
However, they cited concerns about the ability of this and comparable products to help develop complex, compute-intensive and mission-critical on-line transaction processor applications in client/server environments.

Version 3.0 contains a range of new features, some of which the company said will strengthen users' ability to develop such large-scale applications. These include repository enhancements to allow developers to define graphic behavior associated with data and performance improvements.

Other features

Links to other products, such as Intersolv, Inc.'s PVCS, will help users to centrally manage applications. Open application programming interfaces to PowerBuilder libraries have allowed computer-aided software engineering tools vendors sueb as Bachman Information Systems, Inc. to connect to PowerBuilder.

Configurable tool bars and shared result sets across multiple DataWindows, as well as drop-down data windows, smooth the development process, Powersoft officials said. This release will also offer support for the Watcom International Corp. SQL database for building stand-alone applications or for working with server-based applications while detached from the network, they said.



Source: Forrester Research, Inc.

Improvements to reporting capabilities include business graphics, cross-tabs and labels and an object query painter, which lets users visually create database query objects that offer business views of database information.

PowerBuilder, *page 83*

Introducing

The greatest advance in COBOL programming since the Post-It™ note!

COBOL Source Analyst (CSA) is a new, fully interactive productivity tool that allows you to quickly analyze complex COBOL source code directly

- Navigation– allows rapid examination of the branching logic of a program;
- Outlining– provides hierarchical views of the

CSA supports COBOL II®, OS/VS®, Micro Focus®, CA-Realia®, ANSI-74 and ANSI-85.

CTC

Byte out of crime

CONTINUED FROM PAGE 81

period and fully operational since April 1991, is expected to help the Phoenix police tackle the city's steady growth in crime. Mike Barry, assistant administrator of the department's computer services bureau, said the department anticipates a 20% rise in police reports over the next four years, based on studies of crime growth trends of the past 20 years.

ON SITE

Phoenix Police Department
Phoenix

Challenge: To replace paper police reports with computerized records.

Technology: Unisys LINC II CASE software, Aes mainframe, CTOS workstations; PCs; HP 3000 minicomputers, Motorola gem-386 mobile data terminals.

Benefits: Reduces the time to generate and distribute police reports; allows new data matching capabilities; saves $75,000/year in maintenance.

"Using PACE, our officers can file reports faster and spend more time in the field where they're needed," Barry said.

Once data entry clerks finish a report, they send it electronically to the appropriate bureau, such as homicide; it is simultaneously reviewed by the reporting officer. The reports are stored on a case management subsystem that compiles supplements to the original case such as laboratory reports and letters to insurance companies.

Before PACE, the department relied on the manual delivery of color-coded, paper-based police reports to different divisions. It often took three days or more for detectives to receive the reports on their cases. With PACE, detectives receive the reports as soon as they have been completed.

PACE will be supported by other planned systems upgrades and additions. The police department is in the midst of replacing an aging minicomputer-based computer-aided dispatch/mobile data terminal (CAD/MDT) system with a network of 150 Intel Corp. 80386- and 1486-based PCs. The PCs will be connected to three Hewlett-Packard Co. HP 3000 minicomputers via host-to-terminal links.

The new CAD/MDT system cost the department $9.2 million and is scheduled for full operation in January 1994. It will route calls for patrol officers and will eventually send detailed information to police cars equipped with Motorola, Inc. 9100-386 mobile data terminals.

The Motorola terminals are expected to provide patrol officers with critical information about any crimes in progress that they are assigned to while alleviating the work load of the department's radio dispatchers. Since most of the department's patrol cars are staffed by just one officer, the mobile data terminals will act, to some degree, as their partners.

For example, with the Motorola terminals, officers will receive a detailed sketch about a convenience store robbery in progress, including whether the assailant has a gun and a physical description of the premises. The data terminals will be installed in 675 patrol vehicles and some unmarked cars beginning in mid-January.

The CAD/MDT system will eventually feed into geographic information systems (GIS) being developed by the city of Phoenix, which is using GIS tools from Environmental Systems Research Institute, Inc. in Redlands, Calif., to construct GIS applications [CW, June 14]. Tying into the GIS systems with their Motorola mobile terminals, officers eventually will

HOW TO SELL USED EQUIPMENT.
Advertise in Computerworld's Classifieds. They work.
800-343-6474
x744

U

including the new DCE from OSF,™ which allow you to take advantage of a host of new software technologies, including client/server applications.

Op is the na

N

AIX/6000 has no par.

What are you driving for? Open computing and superior price/performance? Then set your course for the most open UNIX® operating system in the field, AIX® for RISC System/6000®. AIX/6000™ is unquestionably open, so it will fit in with your existing equipment and network communications links, whether they are from IBM or not. AIX/6000 complies with all relevant UNIX industry standards,

Over 6,500 applications are par for the course with AIX/6000. Everything from application development tools to accounts receivable, from

IBM, AIX and RISC System/6000 are registered trademarks and AIX/6000 and CICS/6000 are trademarks of International Business Machines Corporation. All other products are trademarks or registered trademarks of their respective companies. © 1993 IBM Corp.

be able to receive detailed information about building plans and situations such as hazardous materials at emergency scenes.

Use of GISs is on the rise at other police departments — San Diego and Baltimore, for instance — and has enhanced their crime-solving capabilities, said Willpen L. Gorr, a professor of public policy and MIS at the Heinz School of Public Policy and Management at Carnegie Mellon University in Pittsburgh.

PowerBuilder

CONTINUED FROM PAGE 81

In addition, Powersoft will ship two scalable products on the low end — PowerMaker and PowerViewer. Features include the ability for end users to access data and create queries and reports.

Users and consultants praised the new capabilities.

"There are a lot of advanced features with 3.0 that just aren't available with 2.0, so we've been using the new version to convert our Prime mainframe applications," said Joe Horecny, a project leader at Chrysler Systems, Inc., a subsidiary of Chrysler Corp. in Oakbrook, Ill., and a beta-test user of 3.0. Horecny said tool bar objects and improved reporting facilities were particularly helpful to his group.

The new release is a big step from the current version, according to Donald de Palma, an analyst at Forrester Research, Inc. The data connections are better than they were, he said, and the Watcom database allows for local prototyping before deploying algorithms out to Sybase, Inc. or Oracle Corp. databases.

Also, the ability to link to third-party components strengthens PowerBuilder by making it "more of a pegboard" as opposed to a discrete, proprietary tool.

What about the high end?

But de Palma and others raised questions about the ability of PowerBuilder to handle high-end, transaction-intensive applications, since the scalability of tools like PowerBuilder and Gupta Corp.'s SQL Windows for that kind of development is as yet unproved. PowerSoft is addressing some of those issues, but client/server development has so far been in "toe-dipping, single-department mode," de Palma said.

Fourth-generation language vendors such as Progress Software Corp. and Cognos Corp. are beginning to target client/server development, and they have the advantage of years of experience with large-scale applications. The current crop of Windows-based tools have not had as long to mature, de Palma said.

In a Forrester Research study of mainframe development at 53 companies:
- 92% of the projects accessed a single database.
- 60% were single-department, decision-support projects.
- 70% were deployed to 50 or fewer users.

While this version improves on earlier releases of PowerBuilder, said Terrence Oi, a manager at KPMG Peat Marwick in Boston, the product has been a bit slow for applications with a strong data entry and transaction processing focus, particularly when compared with traditional mainframe CICS applications.

But at Standard Commercial Tobacco Corp., the five or so users of one data entry application, who handle about 40,000 transactions per day, have found PowerBuilder's performance to be sufficient, said Randy Rabbin, a programmer.

On the low end, Windows-based tool makers compete with Microsoft Corp.'s Visual Basic. "Visual Basic is every tool vendor's nightmare and threatens to become the universal programmer's Swiss Army knife of the '90s — nearly every site is equipping developers with Visual Basic as one tool they will use," de Palma said.

DO YOU SELL OUTSOURCING?
Advertise in Computerworld's Time and Services Classifieds. They work.
800-343-6474
x744

IT'S AMAZING WHAT PEOPLE CAN ACCOMPLISH WHEN THEY WORK TOGETHER.

We can get your people working together like they've never worked together before. ■ How? By realigning your information systems with your organizational goals, so you have the flexibility to react quickly to changing market conditions and customer demands. ■ You see, as a systems integrator we can provide the powerful, tailored solutions you need to make the transition from a legacy system to a client-server environment — planning, designing and implementing for open systems. ■ But more importantly, we can provide the Brainware™ — that is, an abillty to integrate the most intelligent solutions into your environment. ■ As an independent evaluator of technology we are free of vendor bias, so we can guide you to the most effective standards and solutions. ■ And unlike most vendors, we can provide you with ongoing services — networks checks, systems administration, maintenance. Whatever you need to ensure continued operational effectiveness, we'll do. ■ Interested? Then call us at 1-800-257-OPEN. With our help, who knows what amazing things your people can accomplish.

CONTROL DATA

The Integration Company

©1993 Control Data Systems, Inc.

▶ **Illinois Power's Max Burgstahler:** *'People's minds are just starting to click' about the need for SQL connectivity*

POWER TO THE PEOPLE?

SURE, GROUPWARE IS GREAT. BUT THE ELECTRIFYING GROWTH OF NOTES AND OTHER PRODUCTS POSES HUGE NEW INTEGRATION HASSLES. HERE'S HELP.

As groupware projects within organizations proliferate, information systems directors face mounting challenges that require the diplomatic skills of an ambassador and the technical savvy of a helicopter mechanic.

Groupware applications in individual business units have multiplied like rabbits. Unfortunately, that has left IS directors faced with scores of applications that must be integrated with organizations' overall system resources.

At Illinois Power Co. in Decatur, Ill., for example, SQL connectivity has captured the imagination of the utility's personnel. The utility plans to build an application linking a Notes database for engineers with a SQL database containing engineering parts numbers.

"People's minds are just starting to click [about the need for SQL connectivity]. They see it as something with real potential," says Max

Groupware, *page 86*

Groupware

CONTINUED FROM PAGE 85

Burgstahler, Illinois Power's information technology supervisor.

"Integrating Notes with SQL databases is the biggest problem we have," says Kevin Danehy, senior business analyst at Millipore Corp., a filtration equipment manufacturer in Bedford, Mass. "There's a lot of data that the sales force has using Notes that needs to be analyzed."

In addition, Danehy says, salespeople must be able to attach a query to an electronic-mail message that would then access a customer list on a SQL database to provide a profile of that customer.

To solve this problem, Millipore is beta-testing a custom-built product, called DataMover, that will link a SQL database to Notes using Dynamic Link Libraries, Danehy says, allowing Notes users to run queries as background tasks.

Source: Dipper & Associates, Inc., Alford, Mass.

Getting a jump

However, Millipore is way ahead of its IS brethren in terms of integrating Notes with SQL databases, with most IS directors just now beginning to consider the implications of integrating two completely diverse environments.

"Sooner or later, we're going to need to feed all this [groupware] data into the existing mission-critical applications," says Jeff Held, a partner in the technical services practice of Ernst & Young in Vienna, Va.

Unfortunately, integrating a host of sundry applications poses a problem. Many IS personnel simply don't possess the language skills required to manage diverse groups or departments that have created groupware applications using PC application development tools.

So one of the first orders of business for IS directors — who tend to be schooled in Cobol language and SQL databases applications — is to become fluent in a PC world dominated by macros and @Commands working directly against documents and forms.

"Groupware is such a different beast for information technology that it's like speaking a completely different language for which they have no common base to understand," Held says.

Because of these issues, IS personnel must change the way they think about computing, especially in the realm of application development.

"Groupware has taken the same path as local-area networks in that it has come out of the field. The problem is that the people in the glass house are discovering to their horror that these applications can now affect their corporate data and they have no control over them," Held adds.

Moreover, because IS personnel tend to be focused on procedural languages such as Cobol and C, they tend to be poor programmers in groupware environments that tend to be based on PC programming techniques running against applications based on a document metaphor.

"If I have two people with equal pay, and one is a Cobol programmer and the other is a spreadsheet programmer, I'll take the spreadsheet programmer every time," says Norman Weizer, president of Weizer Associates, Inc., a consultancy in Lexington, Mass.

"The best candidates are business operations people with technical backgrounds who can look at a process and automate it — someone who has been both a business and systems analyst," adds Randal Zahora, president of Workgroup Productivity Corp., a consultancy in Oak Brook, Ill.

Although groupware application development is likely to be the province of individual departments, the coordination of the activities of these departments will require the orchestration of an IS director who can set up hierarchical naming services and enforce standards and practices.

"Groupware is a technology that can easily get out of control and turn into a real nightmare. Ideally, you want to bring IS in early because most organizations will go crazy when they first get started," Zahora says.

"You need to involve people who know both IS and groupware systems. With groupware, you can fall down a hole and find yourself going to hell in a handbasket in a hurry," Weizer adds.

Without IS support, in fact, customers will find themselves with an implementation that's either poorly used or not used at all, he adds. Some IS staffs are at odds with some users because of a fear stemming from the loss of control implied by groupware.

"IS people need to change how they think. They tend to think in terms of outer joins, rows and columns. End users live in a world of documents," Held says. "Ideally, you would want IS people to be out ahead of the users, but we've found that IS people just don't get it, and the reaction is pretty negative."

Aggressive adopters

But several IS shops have adopted proactive stances toward groupware applications. Bankers Trust Co., for example, has completely reorganized its IS department by pushing responsibility for application development down into the individual business units, with IS maintaining the company's overall IS infrastructure.

Held argues that the Bankers Trust model essentially blesses the existing state of affairs within most organizations today.

"Every department has its dBase application or some other set of applications that has been covertly created that IS has no idea about," Held says. In fact, he adds, moving responsibility for application development down into

GET READY FOR CULTURE CLASHES

Although groupware's cultural impact on an IS organization is at first likely to be a pivotal concern for the IS director, the real challenge to an IS chief's management skills will come from his or her dealings with individual departments.

Once an IS department decides to evangelize the adoption of groupware within the organization, there are a number of political and psychological hurdles that they are likely to encounter among users.

"Technologists tend to be blind to certain business issues," notes Bob Halperin, executive director for coordination science at MIT.

Salespeople, for example, are likely to be the most resistant to a groupware application, Halperin says, because most salespeople view their worth as directly tied to the number of sales contacts they have.

"Salespeople tend to view sales leads as their domain, and they take them from company to company as they switch jobs. They may not want to put that information into a shared database," he says.

▶ **Randal Zahora** *sees an aversion to groupware products*

At the same time, IS people must apply their systems-analysis skills to groupware, especially when automating what was an inefficient paper-based process.

"When you automate a bad process, what you get is a fast, bad process that's widely distributed," says John Dwyer, a systems engineer at Corporate Software, Inc., a reseller in Canton, Mass.

In addition to psychological issues, IS directors are likely to encounter middle managers who may feel threatened by groupware.

Fear of technology

At Illinois Power in Decatur, Ill., for example, information technology supervisor Max Burgstahler ran into some managers who resisted the flattened organizational structure that groupware promotes by giving all members of the organization access to shared data.

"It can be threatening to anyone who doesn't see themselves in a flattened organization. Fortunately, we have a pretty strong empowerment culture that is committed to increasing communications throughout the chain of command," Burgstahler says.

"It's a cultural issue, but people are becoming a lot more open these days," adds Paul Dunton, director of technology planning at Pacific Gas & Electric in San Francisco.

Finally, IS must assume the role of educator.

"A lot of times we'll hear from IS people that their executives simply won't use products like Notes," says Randal Zahora, president of Workgroup Productivity in Oak Brook, Ill.

To address this, Halperin says IS must get closer to the business units so those units can witness for themselves the real payoff from technology.

—Michael Vizard

individual business units is the only winning strategy available to IS shops.

"When you have a centralized IS, it's always going to be hit by more demand than it can service. So as far as somebody is concerned, IS is always going to make a wrong decision. If you move application development down to the business units, it's their responsibility to fund development," Held says.

Another road traveled

Some organizations have opted to bring the expertise of the business units into the central IS organization. Soch was the strategy used by Johnson & Higgins, a New York insurance carrier that brought William Wilson III from a field office into its IS shop as a company vice president.

Taking a more middle-of-the-road strategy is Pacific Gas & Electric Co. (PG&E) in San Francisco. The IS shop provides departments with a series of standard Notes applications that can be deployed alongside any custom Notes applications that are developed by departments. To do this, PG&E has set up a specific task force within its IS organization that is dedicated to office computing.

"About 10 years ago we saw that it would be futile to resist PC technology. So we set up a group within IS that would be enthusiastic about it and create a manageable environment," says Paul Dunton, director of technology planning at PG&E.

The IS group at PG&E will evaluate the quality of any Notes application that might be distributed across different departments, where 40 servers now support 1,700 users.

"Typically, we show them why a particular application might not have the performance they are looking for across a WAN," Dunton says.

But organizations such as PG&E and Bankers Trust tend to be the exception, not the rule. Persuading IS shops to facilitate groupware applications, not fight them, represents one of the great cultural roadblocks to the adoption of groupware. "A lot of IS people are going to go into this kicking and screaming," says Susanna Opper, president of Opper & Associates, Inc. in Alford, Mass.

After all, she says, groupware applications require IS people to navigate a large number of social, political and business issues for which they are poorly prepared. "We no longer live in a bifurcated world where there are separate business and computer shops. Groupware is the way business will be done," Opper says.

In addition to the social issues involved, IS people tend to look askance at groupware because of their technical training.

Specifically, groupware applications tend to de-emphasize security, testing and standardization issues in favor of solving an immediate business problem across what many IS people consider to be unstable networks.

"The programmers and working-level people at IS shops tend to get very nervous. They find it totally confusing because a lot of the concepts they have learned simply don't apply," Weizer says.

"IS people tend to look at groupware as something done by a bunch of cowboys," Opper says.

Despite these issues, just about everyone involved with groupware reports that getting IS behind a project is still a critical requirement.

"IS gets excited once they're involved. It's an opportunity for them to really shine and to be proactive. It's also a new technological challenge, and they know it's going to be mandated whether they like it or not," Zahora says.

Re-engineering is a big driver. "As we keep moving toward the virtual corporation, it will become more important for IS to put business goals through an [information technology] prism to see ... what the technology will allow," says Bob Halperin, executive director for coordination science at MIT in Cambridge, Mass.

The big picture

As most of the growth — which includes technologies ranging from distributed databases such as Notes, work-flow routing, calendaring and scheduling software and other E-mail-enabled applications — is being widely deployed, it is being done on an ad hoc basis with little overall care for strategic architecture.

Even PG&E, which is on the cutting edge of groupware development, is just getting its arms around these issues. "We've just started a strategic planning group that makes sure our long-range business plans will be linked to our [information technology] plans. Individual groups have pursued these links before, but we want to make sure the company has a bidirectional link," Dunton says.

"Companies need IS people to be the architects and long-range planners for them," Weizer notes. ■

AN ACTION-PACKED SQL: LINKING DATABASES

One of the biggest challenges currently facing IS directors who have already opted to deploy Notes packages is the integration of this groupware offering with SQL database services.

"Notes is still relatively young, but the need for this integration is going to become apparent in the next couple of months," says Norman Weizer, president of Weizer Associates, a consulting firm in Lexington, Mass.

But pulling that integration off is likely to provide a significant challenge to IS personnel.

"The texture of the data is quite different. SQL databases are rows and columns, while Notes is a text-oriented environment with lots of discussion databases and graphics," notes Max Burgstahler, supervisor for information technology at Illinois Power in Decatur, Ill.

Despite these differences, the integration of the two environments is still a worthwhile project. Since an individual Notes database is only 1G byte in size, developers have begun working on Notes applications that will take advantage of a dbLookup facility in Notes to access lists on much larger SQL databases.

For example, a Notes user will be able to look up a mail list kept on a SQL database in order to find which users should participate in a particular Notes discussion. To facilitate such applications, Lotus is working on providing a series of DataLens drivers for Notes Version 3. Those drivers, however, are still undergoing beta testing.

▶ Norman Weizer: *Need for integration becoming apparent*

In the meantime, some Notes sites have been working with a Data Pump tool from Trinzic Corp. in Portsmouth, N.H., which provides a tool that allows data to be exchanged between Notes and a SQL database in batch mode.

In addition to the Data Pump, some of the more adventurous Notes sites have worked with the Notes application programming interface (API), which is written in C language, to link Notes to SQL databases.

Lotus Development Corp. is also currently working with a variety of SQL database tool vendors to support Notes with their application development tools, according to Notes product manager John Bartlett. This work should eventually allow a Notes user to update a SQL database.

"Linking SQL application development tools with Notes is a natural. There's a synergy because there is a lot of structured and unstructured data in Notes," adds Brownell Chalstrom, president of Chalstrom Consulting, Inc. in Oakland, Calif.

However, working with the Notes API is not for the faint of heart. "I tend to stay away from the Notes API; it's not easy to use," says John Dwyer, a systems engineer at Corporate Software, Inc., a reseller in Canton, Mass.

—Michael Vizard

Calendar

AUG. 29-SEPT. 4

Annual International Gupta Developers Conference. San Francisco, Aug. 29-Sept. 1 — Contact: Gupta Corp., Menlo Park, Calif. (415) 321-9500.

Worldwide OS/2 and LAN Systems Conference. Lake Buena Vista, Fla., Aug. 29-Sept. 2 — Contact: Joshua Weinberg, Technology Solutions, New York, N.Y. (212) 505-0900.

Fed Micro '93 CD-ROM and Multimedia Conference and Exposition. Washington, D.C., Aug. 31-Sept. 2 — Contact: Tom Lauterback, National Trade Productions, Inc., Alexandria, Va. (703) 683-8500.

Structured Development Forum. Philadelphia, Aug. 31-Sept. 2 — Contact: Espirit Systems Consulting, Inc., West Chester, Pa. (215) 436-8290.

SEPT. 5-SEPT. 11

Compuexpo '93. Las Vegas, Sept. 9-11 — Contact: UNSC Investment Group, Newark, Calif. (510) 657-3418.

SEPT. 12-SEPT. 18

Penn Tech '93. Philadelphia, Sept. 13-14 — Contact: Pennsylvania Technology Council, Pittsburgh, Pa. (412) 687-2700.

Engineering Document Management Systems. Anaheim, Calif., Sept. 14-16 — Contact: The Kalthoff Group, Cincinnati, Ohio (513) 871-6908.

Omnicom Week Conference. San Diego, Sept. 14-17 — Contact: Sherri Ross, Omnicom PPI, Phillips Business Information, Inc., Potomac, Md. (301) 424-3336.

SEPT. 19-SEPT. 25

Business Excellence For Top Management. Kansas City, Mo., Sept. 21-23 — Contact: Joanne Gordon, Sandra Conn Associates, Inc., Chicago, Ill. (312) 327-0082.

Mobile World. San Jose, Calif., Sept. 21-23 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Second IEEE Network Management and Control Workshop. Tarrytown, N.Y., Sept. 21-23 — Contact: Hart Rasmussen, Workshop/Tutorial Registration, CATT, Hawthorne, N.Y. (914) 347-6942.

Unix Expo '93. New York, Sept. 21-23 — Contact: National Blenheim Expositions, Inc., Fort Lee, N.J. (201) 346-1400.

Document World '93. Hartford, Conn., Sept. 22-23 — Contact: Key Productions, Inc., Hartford, Conn. (203) 247-5363.

SEPT. 26-OCT. 2

Association of Banyan Users International Hosts Conference and Expo. Ottawa, Sept. 26-29 — Contact: Association of Banyan Users International, Chicago, Ill. (312) 644-6610.

IS as a Service Organization. Columbus, Ohio, Sept. 27-28 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7873.

How to pass the bar exam.

Scan this bar code with your eye. Notice how clearly defined its characters are. A scanner will find no trouble in this bar.

An impressive lineup. Our toners perform in extreme temperatures. Nice to know when your printer's on-line for hours on end.

Perfect consistency of blackness from beginning to end is typical of IBM toners by Lexmark.

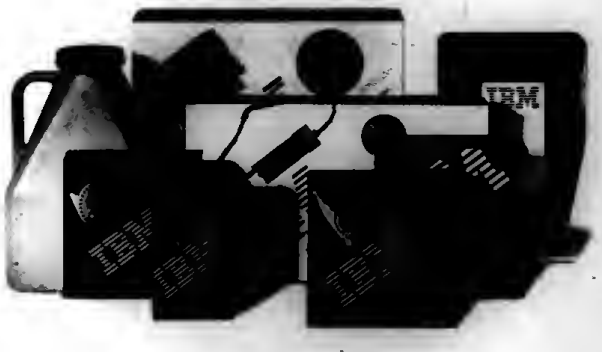
Our high-quality toners virtually eliminate "bridging" between scan lines.

These days, there's a code we all must live by. The bar code. And as common as the bar code is, it is the very devil to render properly. One tiny error, and a spool of thread becomes an entire suit.

Lexmark strives to surpass the precision that is expected of our IBM® toners. The IBM toners that many industries rely upon for crisp bar codes can make your printing look sharp, too. Insist on original IBM toners by Lexmark. You'll be using the best, bar none.

To locate the dealer nearest you, to order, or to receive your free catalog, call 1-800-438-2468, ext. 50. (In Canada, call 1-800-663-7662.)

Lexmark International, a former subsidiary of IBM, is an independent, worldwide company that develops, manufactures, and markets IBM personal printers, IBM typewriters, related supplies and keyboards.



IBM Supplies by

LEXMARK™

Make Your Mark

IBM is a registered trademark of International Business Machines Corporation in the United States and/or other countries and is used under license. Lexmark is a trademark of Lexmark International, Inc. ©1988 Lexmark International, Inc.

IBM SUPPLIES BY LEXMARK. TAKE A CLOSER LOOK.

The convergence of TV and computers . . .

Consumer and computer technology is coming together to produce a "communicopia" of interactive TV and multimedia applications. This merger is also creating a

demand for the IS "techno-artist" — a person with the development and artistic skills to bring these applications alive.

By David Baum

HOW IT WORKS

It's pretty much been that machines have known their place. Users go to their computers to power up their word processing program, do a little spreadsheet work, stuff like that. For entertainment, they turn to the television, maybe watch a little Letterman and hope to catch his latest Top 10 list.

Faster than you can say "*Star Trek* reruns," however, things are changing. There's a shift happening that is blurring the lines between computer and consumer technologies. The same TV through which you can tune in to CNN will be able to deliver an on-line newspaper or let you order a pizza.

Best of all, this convergence of technologies — computers, TVs, cable, telephones — is creating job opportunities for "information systems like nothing you've seen in a long time (see story below).

Brave new world

The killer apps in this brave new world are known collectively as "interactive multimedia," computer-based applica-

Convergence, *page 90*

. . . creates new job opportunities for IS

WHAT it MEANS

The convergence of consumer and computer technology means great opportunity for computer professionals, as well as for a new hreed of managers to work with them.

This hurgeoning area will require a slew of software developers, hardware designers, systems analysts, network administrators, digital audio/visual specialists, database administrators, communications gurus and other professionals to huild the infrastructure that hrings multimedia productions to market.

Creative people are needed to put together the interactive products and services that people will use.

Currently, there are as many as 100,000 people working full-time in the multimedia field, says Doug Millison, editor of *Morph's Outpost on the Digital Frontier*, a new magazine for multimedia professionals.

Certain industries have rushed headlong into hiring multimedia specialists. Publishing companies such as Time Warner, Inc., The Walt Disney Co. and Paramonnt Communications, Inc. are "gearing up for the information highway in a hig way" as they prepare for a populace that will quickly demand new forms of entertainment, according to Marc Canter, head of San Francisco-based Canter Technology, which is working on interactive television and multimedia applications.

Job opportunities, *page 90*

Convergence

CONTINUED FROM PAGE 89

tions that combine text, graphics, video, audio and animation into a media experience for users.

Interactive computer technology will give formerly passive viewers (or users, if you will; the terms are becoming interchangeable) almost total control over what they see, when they see it and what they do with it, predicts George Gilder, author of the book *Life After Television*.

Interactive TV is finding its way into mainstream business applications. Today's retail giants, for instance, are eyeing the approximately $70 billion that U.S. consumers spend on catalog shopping each year. What if that service could be made even easier? Toys R Us, Inc. is creating a private TV network and experimenting with video compression technology to sell products via an on-line, on-demand shopping network.

Meanwhile, the New Jersey Department of Education is creating an interactive TV system where students use remote control to respond to a lesson, and results are automatically tabulated for the instructor's immediate review.

Health care companies such as Blue Cross/Blue Shield of Massachusetts are investigating the concept of "desktop docs," kind of a house call with a high-tech twist. Interactive TV would enable patients to contact practitioners through video, getting medical advice on the fly, says Martin V. Joyce, executive vice president of the client services group at the Boston-based company.

Branching out

For its part, the entertainment industry will take on elements of computing that until now have been available, to a rudimentary fashion, only on advanced workstations.

While watching a nature show, for instance, a viewer could pop up a map of an animal's habitat or select more data from a list of facts.

Video-on-demand would let a viewer use his remote control to scan a menu of titles on the TV, searching and selecting movies.

It's an ambitious vision of pick-as-you-go use. With the market expected to reach $3.5 trillion worldwide by 2001, according to John Sculley, Apple Computer, Inc. chairman, it's no wonder some heavyweight companies in the computer (Apple, IBM), cable (Tele-Communications, Inc.) and entertainment industries (Time Warner, Inc., Paramount Communications, Inc.) are aggressively involved.

Vital moves

What will make this grand vision of interactive communications possible? These technical advances are vital:

•The ability to translate all audio and video communications into digital format. A variety of computer and electronics companies are hard at work on this area. The list includes Apple, IBM and Canter Technology, a San Francisco developer of interactive TV and multimedia applications.

The work, which is reminiscent of assembly programming, may be the "easiest" part; what will be daunting is the effort to digitize existing information resources, such as art archives.

•The ability to transmit digital signals over high-bandwidth fiber-optic lines or via ultra-high-frequency wireless. This new digital highway will, in the words of John Segall, GTE Corp. vice chairman, "tie the world together in a hush of photons." Almost every large telecommunications and cable company is working on it, including GTE in Stamford, Conn., BellSouth Corp. in Atlanta, Tele-Communications in Englewood, Colo., and Time Warner in New York.

However, Corning, Inc., which makes optical fiber, predicts that rewiring networks and substations will take until 2037.

•New compression and storage methods. Companies are furiously at work on digital storage for complex multimedia objects on special computers called video servers, from which they can be dished out on demand to TV users.

Right now, storing data digitally is a crushing demand, too much for today's disk drive to handle. Help may come in the form of CD-ROM enhancements, in which double-speed, quadruple-density CD-ROMs will provide the bandwidth to carry two hours of good quality audio and video objects on compact disc, according to Walt Klappert, head of technology at Warner New Media, the interactive multimedia subsidiary of Time Warner.

Others envision a home cable box or chips built directly into TVs that will enable digital functionality for interactive TV. Massive amounts of data will be sent down a fiber-optic wire or via satellite transmission, with chips in the home to decode, interpret and display the data at speeds greater than 100 million instructions per second. ■

Education

CONTINUING EDUCATION IN MULTIMEDIA:

■ SAN FRANCISCO STATE UNIVERSITY (415) 338-1111
Comprehensive, including multimedia authoring on the Macintosh and PC, interactive 3-D graphics, digital video production, graphic arts, advertising, multimedia business management and interactive cinema.

■ CALIFONNIA STATE UNIVERSITY, Hayward (510) 881-3000

■ NEW YORK UNIVENSITY (212) 998-1212

The sky's the limit for tomorrow's technology

Hewlett-Packard Co. is one of the players in interactive TV, as a producer of microprocessor-based "boxes" that send and receive information to enable users to order pizza, check a bank balance and so on from their homes.

Lew Platt, president and chief executive officer of HP, recently discussed where the industry is heading with free-lance writer Joe Panepinto.

HP's Lew Platt: *'We see a future where computing is pervasive'*

"We see a future where computing is pervasive, where computing, communications, consumer electronics and, eventually, education and entertainment come together.

"By the end of the decade, you will be able to have any information you want or communicate with anyone you want to, anywhere, anytime. For example:

• You won't have to read through articles and reports because you might need the information at a later point. When you require data on a topic, you will simply ask your information tools to find it and sort it for you.

• You will talk to experts 'face to face' through your television to receive advice on anything from remodeling your bathroom to treating a bee sting.

• Your children's education will benefit. For example, when your daughter prepares a report on American history, she will download a document from the Library of Congress on to your home PC.

"People want to be free of time and location constraints."

Creates new jobs

CONTINUED FROM PAGE 89

"All the word processing machines and spreadsheet machines have been bought," Canter says.

He points out that growth in the productivity software area, for one, is sluggish, consisting of upgrades by the same 5% of users. "If you want to go hit the other 95% of the world," Canter explains, "you'd better figure out how to integrate with television, with entertainment markets, with intelligent devices and services of all types."

Rise of techno-artist

The challenge, in Canter's view, is not building the enabling technologies — the wiring, the new TVs, the super-density compact disc drives — but producing the snazzy interactive productions that people will tune in to once these capabilities have been put in place.

Canter, who is not only a businessman and software developer but also an opera singer and computer graphics creator, says he envisions the emergence of a "techno-artist," the equivalent of a film auteur. This person would be able to combine the talents of a storyteller, musical director and software developer with the management experience to direct large multimedia projects.

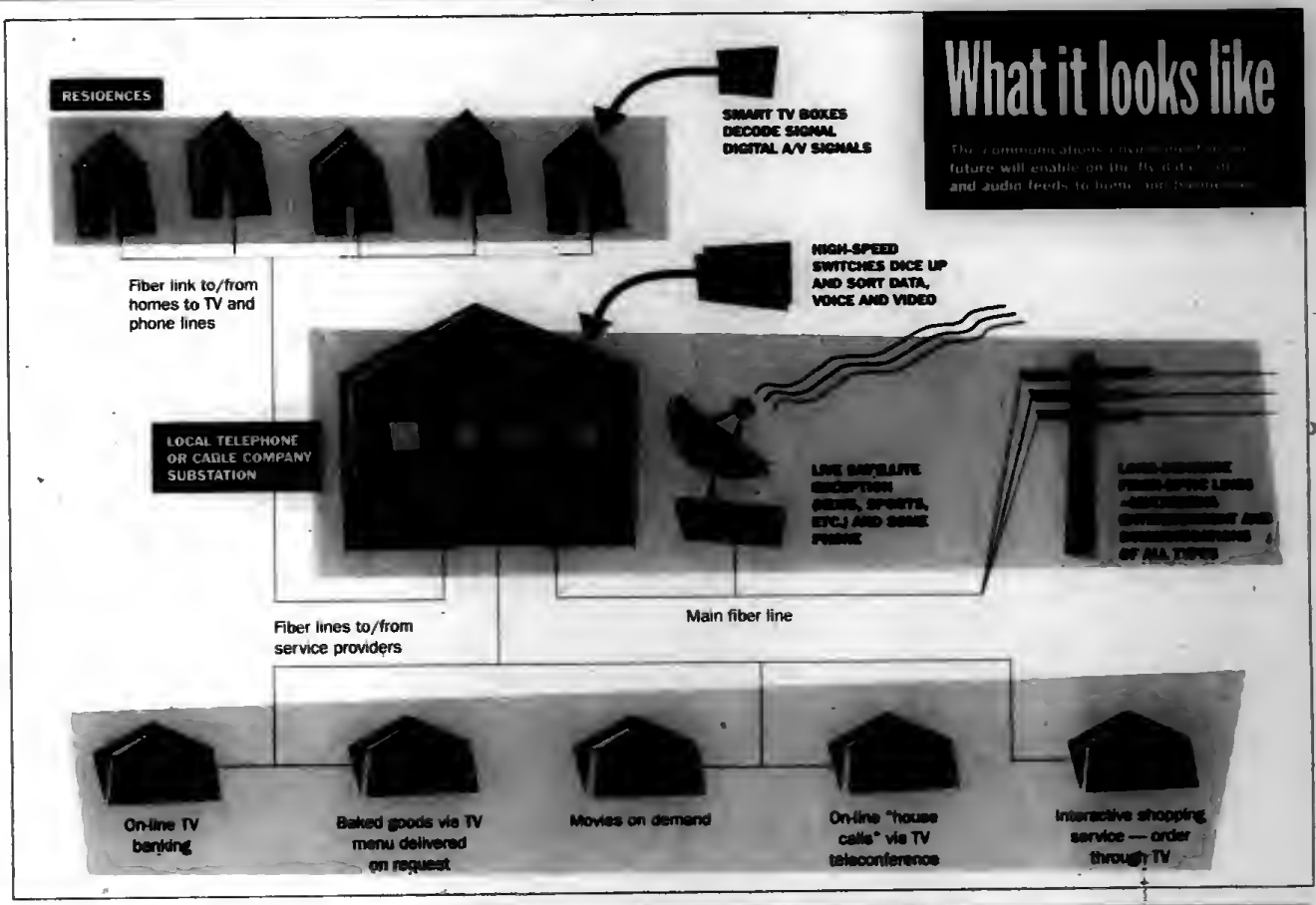
Millison agrees. "It takes an individual with a broad understanding of both the technical and artistic sides to create entertaining multimedia productions." Millison says such an information systems person might have a graphics design background or may have done a stint in film school.

Such skills will open doors to new types of work. For example, to help sell vacation homes, one Los Angeles real estate company recently hired an advertising agency whose IS people had to devise a multimedia kiosk application that would enable users to "walk" around the grounds of the new development, viewing homes from various angles and even browsing from room to room in the new homes.

Users can hear voice-overs on everything from construction elements to the specifications on kitchen appliances and hear the sound of waves crashing as they look out windows to take in the ocean view.

"Personality tests used to classify [IS types] as extremely rigid, meticulous, follow-the-directions people," says Billy Brackenridge, a programmer/engineer at Echo Speech Corp. in Carpinteria, Calif., who designs chips and algorithms for sound cards to use in Apple Computer, Inc. PCs. "But that is no longer the case. The new breed of [IS people] are not just techies but liberal artists."

At Echo Speech, for example, an understanding of music is essential to the creative process. In fact, the job requirements for one recent pro-



gramming position included being able to play a musical instrumeot.

"There will always be a need for hardware designers and software engineers," Millison says. "But these careers will begin to blend with the creative disciplines as technology changes and evolves."

The topics in Millisoo's own publication reflect this blend of the practical and the creative. Among some of the articles in the premier issue are "Building multimedia databases" and "Designing instructional ISDN," but also "Making money as a title brewer."

> A 'techno-artist' would be able to combine the talents of a storyteller musical director and software developer with the management experience to direct large multimedia projects.

The one to watch

One technology evolution to watch is in old software languages, which are changing to handle the requirements of this new field. The foundatioo of multimedia development is today's new authoring systems, which help IS structure the interactive multimedia experience along a time line or through iconographic representation.

Authoring tools are generally based on object-oriented scripting languages, soch as Script X from Kaleida, a joint venture between IBM and Apple.

Another Apple authoring tool, Apple Personal Intelligent Electronics (PIE), includes a media kit for nontechnical people and a programming environment for software developers.

A "nontechnical" creative director at an advertising agency, for instance, could use the media kit to create a roogh prototype of an application. Apple PIE theo generates the scripting code, which is tailored by a skilled software developer to create a slick-running program. Other tools of this type are popping up for Windows and Unix platforms.

"If you want to get in at the core of this, you'd best be learning C and moving quickly on to C++," Canter advises. "The glue that binds it all together is object-oriented technology, with its ability to treat abstract entities like real-world objects."

Multimedia professionals will also have a much more interesting array of interface technologies to work with: voice recognition, holographic interaction with three-dimensional characters and virtual reality interfaces.

"The switch from static, character cell · screens to graphical, event-driveo environmeots is just a shadow of what oser interface programming will soon entail," Millison predicts.

Every screen will be a window into a massive network. Computers will respond to commands that are spoken, scribbled and pointed at, as well as typed. Users may reach for a mouse or may prefer their remote controls.

This means application developers will have to master new kinds of interfacing techniques, where an "event" might just as easily be triggered by someone someday pointing to a sensitive area in a 3-D holograph as it is by someone today moving the mouse arrow to a sensitive area of the screen.

In the communications area, skill in telecommunications, infrared technology and fiber optics will be important. As companies race to put the emerging high-bandwidth infrastructure to work, "there will be a welcome reception for network administrators who can apply these new sciences to the complexities of wide-area and internetwork connectivity," Millison predicts.

Get back to the basics

But all this glitz and glamour doesn't mean that core skills don't cut it. Understanding how a computer is put together, how a disk drive works, what makes a good software program and how to configure a network optimally are still vital skills.

"Those things aren't going to go away no matter how well-insulated we become from them through modern languages, graphical user interfaces and all the other squishy-feely stuff," Brackenridge says.

He pauses, searching for an example. "Sure, we hired a musician to fill a position, and part of his job description is to play video games. But he also happens to be an acoustical engineer and have a degree in physics." ■

Baum is a free-lance writer based in Santa Barbara, Calif.

Reading & resources

■ **MONPH'E OUTPOST ON THE DIEITAL FRONTIER: Magazine for multimedia developers. (510) 254-3145**

■ **EIEERAPN: Holds conferences on computer graphics and interactive techniques. (312) 644-6610**

■ **SMPTE TECHNICAL CONFERENCE AND EQUIPMENT EXHIEIT: Annual event gathers TV, motion picture and related imaging types from around the world. (917) 761-1100**

Help end the class struggle.

Here's your chance to train the next generation of knowledge workers before they show up for work.

Donate your unused computers, software, and peripherals directly to your local school.

Or contact Computers for Classrooms at one of the numbers below, and we'll direct your donations for you.

Either way, your generosity will pay off in gigabytes.

COMPUTERS FOR CLASSROOMS

Because instead of tossing your equipment out, or selling it for a few cents on the dollar, you'll be providing our classrooms with the most powerful teaching aid since teachers.

And getting a tax deduction in the bargain.

So donate the best—and most—equipment you can afford. When you do, you'll be helping a whole new class of people to succeed.

Gifts In Kind America
800-862-GIFT

The East-West Education Development Foundation
617-542-1234

The National Cristina Foundation
800-CRISTINA

Buddy-Up with Education
800-53-BUDDY

COMPUTERWORLD

SQL: A crucial building block

SPECIALTIES

By Joe Panepinto

THE VERDICT IS IN, and it's as close to unanimous as you can get. If you are an information systems professional building database or client/server applications today, you are going to use some implementation of ANSI/ISO-standard structured query language (SQL). And, according to database professionals, these skills are in demand across all vertical industries.

"SQL skills are almost a necessary prerequisite if you're looking for a job in database or client/server development today," says Jeff Tash, database consultant at Database Decisions in Boston.

The level, amount and type of SQL knowledge needed is going to vary widely from situation to situation. For example, SQL commands are divided into Data Manipulation Language (DML) and Data Definition Language (DDL). Recently, the SQL Access Group in Weymouth, Mass., published two extensions to SQL aimed mainly at client/server development: SQL Call Level interface and SQL Remote Database Access.

Most power users can learn from basic tutorials or manuals much of the necessary DML command structure and syntax to retrieve [Select] and edit [Update] tables. But for IS professionals, DDL knowledge is more important and more difficult to learn because it involves the design and creation of the databases themselves — the columns, rows and tables that comprise a SQL database. Database professionals may be able to pick up the necessary know-how from books, or more likely, from vendor-sponsored training aimed at commercial SQL implementations or even SQL training centers such as QED Information Sciences, Inc. in Wellesley, Mass.

Who needs to know?

"The amount of SQL you need to know to hit on a database is pretty limited," says Steve Roti, president of Olympia Software in Seattle. "The amount the database administrator needs to know to set up the tables and make the joins is much more substantial."

Most users see screens with predefined views of the data and can run simple Select queries against it; database administrators need to know what's going on behind the scenes. That means making sure the "joins" necessary to fulfill a Select statement are specified correctly or else power users could easily write ad hoc SQL queries that could take hours to run and consume valuable disk space, Roti says.

In contrast to Cobol, which relies on procedural programming for data manipulation, SQL is nonprocedural and based on "set" theory, Roti says. In Cobol, a programmer combines the data in two tables sequentially by reading the data out of the first table, then doing look-ups on the second table. In SQL, the request is made for "sets" of data (columns of data that can be in different tables) that are then written into a temporary table or "cursor." In theory, the user need not care which tables the data comes from.

"Some people trained in Cobol have to unlearn some things before they can understand SQL," Roti says. "SQL is all about set processing and set mathematics, which presents a different conceptual model for data processing in comparison with sequential record processing."

This leads to a picture of SQL as a somewhat stripped-down, straightforward language that requires in-depth database and data structure knowledge to implement effectively.

Herb Edelstein, a principal at Euclid Associates in Potomac, Md., emphasizes the importance to SQL programmers of basic database design knowledge. While many database application development programs automatically generate SQL code and identify the correct data paths based on graphical depictions of the database, database administrators should know the data paths and double-check their accuracy.

Also, every SQL statement that retrieves or updates data generates locks that can affect other queries or overall throughput, Edelstein says. He recommends that database administrators come up to speed in three areas: general database design, the idiosyncrasies of their particular relational database management system and SQL.

Panepinto is a free-lance writer in Amherst, Mass.

BOOKS

Introduction to SQL by Rick Van der Lans, Addison Wesley, Reading, Mass.

A Guide to the SQL Standard: A Users' Guide by Chris Date, Addison Wesley, Reading, Mass.

The Database Experts' Guide to SQL by Frank Lusardi, McGraw Hill, New York

A Visual Introduction to SQL by Harvey Trimble, Wiley, New York

WHAT IT IS

A database language, an API of sorts that standardizes data requests to local or remote relational databases. SQL deals exclusively with data — data integrity, manipulation, access, retrieval and security. It does not deal with screens, forms or interfaces.

WHAT IT ISN'T

A full-blown, third-generation programming language such as C, Pascal or Cobol, although it is often integrated into these languages.

"Knowing SQL is important, but these days coding in general is only 10% to 15% of a large development project. SQL is clearly an important language to know, but it is just Step 1."

Herb Edelstein, Euclid Associates, Potomac, Md.

COMPUTER CONSULTANTS

In this ever changing economic climate, contracting seems to define the workforce of the future. If you have 1+ years of experience in the areas of Software Engineering or Information Systems, we would like to meet with you.

SOFTWARE
- SCSI DEV/TEST/ADAPTER C
- NOVELL/DOS/PERFORMANCE TEST
- [illegible]/C++

INFORMATION SYSTEMS
- CICS/COBOL/FINANCIAL
- CICS/ARP FINANCIALS
- DB-2 DBA
- IEF CASE TOOL
- SYBASE/UNIX/SUN
- INGRES AND/OR SYBASE
- VISUAL C++/WINDOWS/SQL
- BACAPP/C++
- POWERBUILDER
- SQL WINDOWS/C++
- VAX/UNIX/COBOL
- DW2000/POWERHOUSE

National
Tel: 800/674-9559
Fax: 617/935-7941

Boston, MA
Tel: 617/227-1212
Fax: 617/227-4037

Woburn, MA
Tel: 617/938-1910
Fax: 617/935-4760

Chicago, IL
Tel: 312/714-6100
Fax: 312/714-3756

Atlanta, GA
Tel: 404/551-8130
Fax: 404/551-8137

Vienna, VA
Tel: 703/847-3650
Fax: 703/761-7895

BENEFITS

NEW BOSTON Systems Inc.

We specialize in advancing careers like yours

Here's a partial listing of current fee-paid opportunities. Contact our nearest member firm & gain access to ALL our choice openings in your field.

X WINDOWS DEVELOPER HEAVY
Fx or any trading sys $100K++
UNIX SUN SYBASE C
Financial applications $90K+
VICE PRESIDENT $80-90K
Bank card processing
VICE PRESIDENT $80-90K
Data administration DB2
CLIENT/SERVER LARGE SCALE
Implementation exp. R&D $90K

SR. DATABASE ARCHITECT To $80K
Relat database architecture
MIS DIRECTOR COLORADO $75K
Open systems knowledge a must
SYSTEMS PROGRAMMERS $70K
MVS IMS, IDMS, CICS, or DB2
ORACLE DEVELOPER $50-70K
Form reports tables
KEY DIRECT "FORTUNE 50" CO. $80K
Two full life cycles

IDMS SYS. PROG. PERFORMANCE
PTFs new releases To $80K
TELECOMMUNICATIONS $50-80K
LAN-WAN-MAN (2000+ Devices)
BBA 3+ YRS. EXP. 40K UNIX $60K
Prel Informix repository exp
AS400 RPG/COBOL P/A To $50K
Manufacturing. CASE a plus
ADABAS/NAT/ORAL P/A To $50K
Excellent location & equity

VAX/VMS/C SOFT ENG To $50K
Process control applications
AS400 RPGIII PROG./ANALYST
Manufacturing a plus To $40K
ORACLE PROG. ANALYST $47K
VMS moving to client/server
COBOL CICS IMS DL1
Manufacturing $45K
MULTIPLE OPENINGS $20-45K
IMS/CICS/VSAM/COBOL P/A-S/A

Call or FAX your resume to our local office nearest you. & put our professionals to work for you.

ATLANTA: Accent Professionals, Inc. (404) 668-1116 • FAX (404) 729-0980
BOSTON: The Bloom Group, Inc. (617) 851-1000 • FAX (617) 851-1047
CHICAGO: Career Consultants, Inc. (708) 668-8900 • FAX (708) 668-8704
CINCINNATI: York Group (513) 621-6675 • FAX (513) 621-6971
CLEVELAND: Executive Resources Corp. (216) 391-1717 • FAX (216) 391-0580
COLUMBUS: Manuel Thomas, Inc. (614) 540-9000 • FAX (614) 457-6000
DALLAS: Dallas Personnel Consultants (214) 691-6000 • FAX (214) 691-1000
DENVER: Accent on Computers, Inc. (303) 770-8900 • FAX (303) 770-9045
DETROIT: Anderson, Jones & Muller Assoc. (313) 557-7000 • FAX (313) 557-7006
MONSTER: Career Consultants, Inc. (713) 626-4700 • FAX (713) 626-4708
JERSEY CITY, NJ: Systems Search Assoc. (201) 761-4400 • FAX (201) 761-0538
KANSAS CITY: DP Career Associates (913) 338-0005 • FAX (913) 338-0998
LOS ANGELES: Personnel Resources, Inc. (818) 888-1200 • FAX (818) 888-1208
MEMPHIS: Information Systems Group (901) 684-1010 • FAX (901) 684-1020
MILWAUKEE: EDP Consultants, Inc. (414) 276-4000 • FAX (414) 276-4050
MINNEAPOLIS/ST. PAUL: EDP, Inc. (612) 338-3200 • FAX (612) 338-4480
NEW YORK: Data Processing, Inc. (212) 557-7270 • FAX (212) 557-0500
PHILADELPHIA: Systems Personnel, Inc. (215) 665-9660 • FAX (215) 665-1405
PHOENIX: Professional Career Consultants (602) 234-0000 • FAX (602) 265-5000
SAN DIEGO: Technical Employment Inc. (619) 560-4907 • FAX (619) 560-4909
SAN FRANCISCO: Professionals For Computing, Inc. (415) 957-4500 • FAX (415) 957-0100
SEATTLE: Hosmer, Martin, Weeks & Associates (206) 455-5900 • FAX (206) 903-5900
ST. LOUIS: Executive Career Consultants Inc. (314) 994-9339 • FAX (314) 994-8747
TAMPA: Preferred Data Personnel Agency (813) 888-9000 • FAX (813) 888-9473

Ask for your FREE copy of our 1993 Salary Survey

National Computer Associates

Help for the puzzled network user

A regular advice column focused on technical issues and skills acquisition

KEEPING up

BY ROBERT W. HARBISON

Harbison is owner of Network Integration Consultants in Sausalito, Calif. He is an independent network consultant specializing in the design and implementation of local- and wide-area networks and multiplatform connectivity.

Q. What options are available from public and private packet-switched carriers, and what kind of performance can be anticipated?

A. Public packet-switched networks are available in two basic types, X.25 and frame relay. X.25 networks offer low- to medium-speed performance beginning at 1.2K bit/sec. and progressing up to a maximum of 56K bit/sec.

The X.25 carriers provide for a single connection to their switched packet network, allowing the user to connect to many different sites. This one-to-many type of connection is appealing to users with numerous locations. X.25 networks are available worldwide.

An improvement on the X.25 packet service, known as frame relay, is available from a growing number of worldwide carriers. Frame relay is very similar to X.25 in that it packetizes data with a source and destination address and places the packets on the network where the internal network switches send them to the correct destination.

Frame relay, however, begins service at 56K bit/sec. and provides variable rates up to 2.048M bit/sec. It can be implemented on most existing routers and many bridges simply by adding the software to properly packetize the data and communicate with the carrier network.

Q. What are some of the slower and less expensive ways to connect remote users to LANs or to provide LAN-to-LAN connections?

A. At the low end, standard asynchronous modem communications can handle low volumes of occasional data with speeds up to 14.4K bit/sec. and with data compression enhancements that can bring performance up to 56K bit/sec.

Another method is through the use of the Integrated Services Digital Network (ISDN) Basic Rate Interface. This uses standard telephone circuits in a switched-type connection that offers performance up to 128K bit/sec. Some ISDN equipment provides additional compression techniques that boost ISDN Basic Rate performance up to 400K bit/sec. Most telephone companies are beginning to offer ISDN Basic Rate service in many areas but not all.

Q. What are point-to-point WAN connections and what kind of performance can be expected?

A. When larger volumes of data need to be communicated, dedicated lines can be leased from the telephone carriers in a point-to-point connection with performance between 56K bit/sec. and 1.544M bit/sec.

This type of connection provides for good LAN-to-LAN interconnection as well as performance. The lines are always connected, and they provide a fixed monthly charge.

Be aware of these basic guidelines: A 56K bit/sec. circuit is roughly 175 times slower than a normal Ethernet LAN. And the faster 1.544M bit/sec. connection (known as a T1 circuit), although 27.5 times faster than the 56K bit/sec. circuit, is still 6.5 times slower than the Ethernet performance.

Point-to-point leased line connections must be made for each site you wish to connect to and are billed on a circuit speed flat-rate fee plus an additional per-mile charge; they can be expensive for long distances.

Q. What are the newer communications technologies that are referred to as "fast packet" communications?

A. Fast packet services are based on a cell-switching technology that packetizes all data types such as voice, video and fax into 53-byte cells of information that are forwarded over a cell switching network. Asynchronous Transfer Mode (ATM), broadband ISDN and Switched Multimegabit Data Services (SMDS) all use a common network switching technique known generically as "cell relay."

Each cell is of equal length regardless of data type, thereby providing consistent network performance. Frame relay's variable length data structure is not very adaptable to or suitable for time-sensitive data such as phone or video information. Cell relay, however, can forward virtually all types of data without time variations.

SMDS is available only in large metropolitan areas and is still limited to only a few carriers. ATM and broadband ISDN are on the drawing boards of many carriers, but actual service is generally not available to the average user and probably will not be for at least another year or two. Availability is expected to be spotty at best for the next three or four years.

Software Developers

North San Diego County, California

MVS VTAM NetView UNIX HP-OpenView

Peregrine Systems, Inc., headquartered in Carlsbad, California, is a leading independent software vendor in the network and systems management field that develops network management products for MVS, UNIX, and Novell Netware environments.

Peregrine Systems is seeking several software developers. Skills required include:

- C or C++
- IBM Assembler Language
- TCP/IP
- SNA

Candidates should have a minimum of three years experience performing in a technical capacity relating to networks and have solid programming skills.

Peregrine Systems is an equal opportunity employer and offers outstanding compensation and benefits for the right individuals. Send letters and resumes to the attention of the Development Vice President.

Peregrine Systems, Inc.
1959 Palomar Oaks Way
Carlsbad, CA 92009

Peregrine SYSTEMS

Client-Server Professionals

The Application Group Inc., a leading implementor of Human Resource Information Systems, is seeking data processing professionals with one or more of the following skills:

- Client-server Architecture
- SQL/SQR
- ORACLE
- PeopleSoft
- Gupta
- GUI
- Sybase
- Informix
- HRIS Project Management

We depend on talented, motivated career-minded people and we reward them with excellent salaries & benefits, 401(k) and a unique bonus program! If you can travel, but like to be home on weekends, mail or fax your resume or call:

(EAST OF THE MISSISSIPPI) **Paul Abrahms, Two Mid-America Plaza, Suite 800, Oakbrook Terrace, IL 60181. 800-762-4170. FAX: (708) 954-2336.**

(WEST OF THE MISSISSIPPI) **Jeff Lusk, 200 Pine Street, Suite 800, San Francisco, CA 94104. 800-421-1627. FAX: (415) 765-5200.**

THE APPLICATION GROUP INC.
Equal Opportunity Employer

PRO-STAR

Programmer Analysts & Project Managers
in Salt Lake City

PRODATA/PRO-STAR provides MIS Consulting services to industry & Govt. throughout a 7-State, 9-City region of the West. Our Salt Lake office has experienced tremendous growth, servicing one of the nation's most vibrant economies. We need:

- POWERBUILDER/SYBASE
- SYNON & VISUALBASIC
- C/UNIX/GUI
- CASE: IEF, ADW, or LBMS

Fulltime, salary/benefits or hourly. If you desire career growth along with outstanding recreational amenities and quality-of-life, we'd like to hear from you at:

PRO-STAR
5282 S. 320 W. #D-282, Salt Lake City, UT 84107
801-266-6136 FAX 801-266-0069

CONSULTANTS
Immediate Interviews

MAINFRAMES: Natural 2 CICS • MF/Cobol • Focus DB2/CICS • Ingres • Oracle Systems Integrat. • ANAPS OOS/Ingres • OOS/Progress VAX/RDB/Cobol • CSP • DB2 CLIENT SERVER: Powerbuilder Powerbuilder • Oracle • C++ Sybase/OSA • Sybase/Dev Smalltalk/80 • Focus TCP/IP • Cisco • Novell X Windows • Sys Integrators Novell • Banyan • Sys Admin UNIX/Internals • Informix • HP

RSA Rubin Sawyer Consulting
[illegible] 800-[illegible]
213-[illegible]
Fax: 212-[illegible]

ADVANCED TECHNOLOGY GROUP

Consultants needed for:

Project Manager
Developer
Trainer
experienced in:

Powerbuilder
Gupta Products
Visual Basic/C++
Sybase
Oracle
Unix
C/C++ • Smalltalk

Work in California, Seattle, Texas, Atlanta, Florida

Send resume to:
2900 28th St. #250
Santa Monica, CA 90405
FAX 310-396-6065

The Coca-Cola Company

If you are a highly motivated, experienced information systems professional, seeking a stimulating, professional work environment, you may want to talk to us about these challenging career opportunities in our Atlanta Headquarters:

DATA ANALYSTS

We require professionals with a minimum of 7 years of information systems background including at least 4 years of strong Data Analysis experience. Career background should include contributing to the development and maintenance of Enterprise Models and facilitating shared data projects. Experience utilizing CASE technology, especially IEF, preferred. Candidates should possess strong project management skills, excellent communication abilities, and the ability to lead projects in a matrixed environment.

DATABASE ANALYSTS

We are looking for candidates with a minimum of 7 years of information systems experience including at least 4 years of strong Database Analysis background. Candidates should have both Oracle and DB2 database experience with prior IEF work definitely preferred. Career background should include implementing physical databases and performing database performance modeling and design tuning. Candidates should possess strong project management skills, excellent communication abilities, and the ability to lead projects in a matrixed environment.

SENIOR TECHNOLOGY SPECIALIST - IEF

Candidates for this position should possess a strong background coaching information systems professionals in the use of IEF. Individuals should have a minimum of 7 years of information systems experience including at least 2 years of recent background with IEF. Prefer experience with 2 full life cycles of IEF. Candidates should possess excellent communications and training skills, strong client service abilities, and superior planning and organizing skills.

If you are interested in advancing your career by exploring any of these opportunities, please send your resume with salary requirements in confidence to: The Coca-Cola Company, Staffing Department, Attn: DK, P.O. Drawer 1734, Atlanta, GA 30301. An Equal Opportunity Employer.

EXCELLENCE IN SOFTWARE CONSULTING

We're the Registry, a dynamic, rapidly growing software consulting company dedicated to excellence. Our solid reputation is built on our commitment to understand and meet the needs of our clients and consultants, and to provide superior service to both on a day-to-day basis.

National — Contact: Dan (800) 248-9119 FAX (617) 527-8805
ORACLE DBA • ORACLE/FORMS 3.0 • VISUAL BASIC • VAX/MUMPS • MS-WINDOWS/SDK • C++/OOD/UNIX

Atlanta, GA — Contact: Jeff (800) 255-9119 FAX (404) 257-0566
ASSEMBLER/OCS • IMS/DB2/OCS • ORACLE/FINANCIALS • TPF PROGRAMMER • C++/WINDOWS • STRATUS/COBOL

Boston, MA — Contact: Kevin (800) 248-9119 FAX (617) 527-8805
DB2/TELON-MULTIPLE • ORACLE-MULTIPLE • SYBASE-MULTIPLE • VISUAL BASIC-MULTIPLE • IBM/FOCUS-MULTIPLE

Chicago, IL — Contact: Bill (800) 677-9119 FAX (312) 558-1388
ADABAS/NATURAL • FRAMEMAKER WRITER • TANDEM/C • AS/400-SYNON-RPG400 • ORACLE/FOXPRO/SYBASE

Cleveland, OH — Contact: Ed (216) 328-9900 FAX (216) 328-9339
HOGAN • UNIX/C • MICROFOCUS COBOL • DB2/SQL • ORACLE • C++/TURBOVISION • DB2 DBA/SYS TUNER

Dallas, TX — Contact: Chris (800) 456-9119 FAX (214) 997-4053
UNIX/C++/X-WINDOWS/MOTIF • SMALLTALK BOSCL • C/UNIX/INFORMIX/ESQL • UNIFY/EXCEL • POWERBUILDER/SYBASE

Durham, NC — Contact: Lori (800) 338-9119 FAX (919) 544-9660
UNIX/C++ • DB2/CSP • MS WINDOWS/C++ • X 400/EMAIL • UNIX/INFORMIX or ORACLE • ORACLE DBA • SYBASE

New York, NY — Contact: Sue (800) 544-9149 FAX (914) 937-3314
EASEL • POWERBUILDER • UNIX/C/SYBASE • ORACLE FINANCIALS • VAX/COBOL/RDB • COBOL/CICS/BROKERAGE • ADA/SYBASE

Richmond, VA — Contact: Skip (800) 220-9119 FAX (804) 346-8570
IMS SYS PROG (S) • IMS/DB2 (10) • DB2/CICS (3) • DB2/MPS (7) • SYBASE • SAP/ABAP • SYNON

San Francisco, CA — Contact: Mike (800) 248-9119 FAX (617) 527-8805
ORACLE/FORMS 3.0 • OS/2-PM/C • UNIX/SVR4/AIX/HP-UX • MS-WINDOWS 3.1/ODI/C++ • MOTIF/X-WINDOWS • C/RDB/SQL/ACMS(+)

South Florida — Contact: Tony (305) 779-1500
AS/400/RPG or COBOL • CICS/DB2 • ORACLE PACKAGES • UNIX/SYBASE/POWERBUILDER • PEOPLESOFT

Washington, DC — Contact: Kris (800) 367-9119 FAX (703) 790-8467
TCP/IP/PX/SNA/P • ORACLE V7 • PEOPLESOFT • DEC MCC • SYBASE CNE

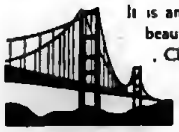
Find out what it's like to consult with a company that's building long-term relationships based on quality, strength, integrity and vision.

The Registry
189 Wells Avenue, Newton, MA 02159
(617) 527-9119 FAX: (617) 527-8805

Member NACCB An Affirmative Action/Equal Opportunity Employer

The Registry

ESCAPE TO ... CABLE CARS. PACIFIC SAILING. SIERRA SKIING ... AND THE HOTTEST TECHNOLOGY OF TODAY.



It is an incredibly successful combination. The beauty of San Francisco and the growth of Charles Schwab & Co., Inc. We're located in one of the most diverse geographic areas in the world and we have one of the most advanced I/S environments in the business. That combination offers you everything you need — from cultural options to sporting ones, and from OSF/DCE/DME to our 3-tier platform: Mainframe—UNIX Client/Server—Workstations. So whether it's geography or technology, you'll simply have a better quality of life with Charles Schwab & Co., Inc.

If you have experience in one of the following areas, find out what this great combination can do for you—send us your resume today.

- Architecture
- Database
- Off-Host Development & Support
- Telecommunications

We offer the competitive salaries, excellent incentives and comprehensive benefits of a recognized industry leader. Relocation assistance is available. Please send or fax your resume, including salary history, to: Charles Schwab & Co., Inc., Human Resources, Dept. ET-009, 101 Montgomery Street, San Francisco, CA 94104 FAX: 415-627-7316. EOE

Charles Schwab
Helping Investors Help Themselves™

Trademarks are registered to their respective companies.

CLIENT/ SERVER

The Office of Administrative Computing at UCSD is developing a client/server environment to enable campus-wide access to university administrative data. This project implements a strategy of distributed computing using state-of-the-art tools and techniques in a rapidly changing environment.

Three positions are available for experienced professionals: 2 Client/Server Programmer Analysts and 1 "hands-on" Project Leader.

Positions require experience in design, development and implementation of large administrative systems, and experience in data analysis and structures. Preferred skills: Sybase server on SUN (UNIX), client tools on PC's, SUN and Macs, client application development tools, TCP/IP, Appletalk/DAL, IPX/SPX communications protocols, mainframe IDMS/R, DB2, and FOCUS.

Salary and level are commensurate with experience. To apply, submit resume with salary history to JOB #100658-D by 8/31/93. UCSD Personnel Dept. 0987, 10280 N. Torrey Pines Rd., Ste 200, La Jolla, CA 92093. AA/EOE

UCSD
The Univ. of California, San Diego

CONTRACTORS!

SEEK Consulting is a leading professional services firm that provides highly skilled MIS and software development professionals on a contract basis. Contact us immediately to learn about current contract opportunities.

SEEK+ CONSULTING

- ▲ Business S/W's, Fin. Svcs.**
- ▲ CICS, COBOL II, Mutual Funds**
- ▲ DB2, IMS, CICS, MICROFOCUS COBOL
- ▲ IDMS, ADABAS/NATURAL**
- ▲ PICK, VB/CDK, Healthy
- ▲ COBOL, VSAM, DOS/VSE, VB/CDK
- ▲ Entry-level Comp. Science grads††
- ▲ PYRAMID, ORACLE, UNIX, SYBASE**
- ▲ C++, C++, OS/2, PM**
- ▲ OO Analysis, Design, Methodologies
- ▲ DBAs, SQL Server, SYBASE, ORACLE††
- ▲ C, C++, UNIX, SYBASE, SQL, Java/Java
- ▲ C, C++, MS-Windows, DDE, DOE, OLE††
- ▲ Visual C++, Visual Basic, Powerbuilder
- ▲ Sapiis SQL Windows, X-Shell

** 12-18 mos. contracts available
†† Full-time opportunities also available

Account Executives - Seek's continued growth has created excellent sales opportunities for bright, aggressive professionals.

401 Edgewater Pl. #430
Wakefield, MA 01880

800-274-1179
FAX: 617-246-0266

In Mass: 617-246-0254

Internet: Seek@world.std.com

ATLANTA BOSTON WASHINGTON D.C.

COMPUTERPEOPLE

Turning Technology Into Power

Immediate professional careers employing APPLICATIONS DEVELOPMENT people for permanent placement and consulting.

Skill	Salary to	Skill	Salary to
CICS or IMS/DC	$45,000	DB2 or IMS/DB	$48,000.
AS400 Cob or RPG	$50,000	C UNIX	$48,000
X Windows	$48,000	C MSDOS/OS2	$44,000
Oracle	$55,000	Tandem	$63,000.
IEF/ADW	$70,000	Powerbuilder	$68,000

Turn to Florida's Leader - COMPUTERPEOPLE, Dept. 525

Tampa Bay Area
12225 28th Street North • St. Petersburg, FL 33716
800-329-2626 • FAX 813-572-1153

Orlando Area
201 N. Orange Ave. Suite 1020 • Orlando FL 32801
800-299-9955 • FAX 407-843-8153

Jacksonville Area
9116 Cypress Green Dr. • Jacksonville, FL 32256
800-700-5945 • FAX 904-737-7369

Ft. Lauderdale Area
5265 Meridian Pkwy. Suite 122 • Ft. Lauderdale FL 33331
800-777-8605 • FAX 305-389-0204

University of Wisconsin - Madison
Social Science Computing Cooperative

The Cooperative operates a 27-node Local Area VAXcluster and a network of 26 DEC and Sun Unix workstations and servers

VAXcluster Systems Manager (entry level)

Manage disks and disk quotas; install and configure new hardware and software; monitor system activity; write, maintain and document DCL procedures; run system backups. Must be willing to participate in user training programs and write user documentation.

Required: Bachelor's degree, one year of VAX/VMS experience, DCL programming. Starting salary up to $30,000 per year plus excellent benefits.

UNIX Systems Manager and Systems Programmer (experienced)

Write, install and configure system software; troubleshoot system problems, control user access; maintain system security, file systems, disk quotas and system backups; monitor system activity; write, maintain and document in-house system software; add and configure new hardware. Must be willing to participate in user training programs and write user documentation.

Required: Bachelor's degree, three years experience in a UNIX network environment, C and shell (or perl) programming expertise. Starting salary up to $38,000 per year plus excellent benefits.

Both positions require the ability to work both independently and with a team, a commitment to personal user support, and the ability to speak and write clearly in English. **How to apply:** Send resume and letter of application focusing on your qualifications to: Beth Wiebusch, Social Science Computing Cooperative, 4408 Social Science, 1180 Observatory Dr., Madison, WI 53706. Electronic applications accepted at wiebusch@ssc.wisc.edu. Deadline: 23-AUG-1993

WE'RE HOT

- IMS DB/DC and DB2
- CICS
- Banking Experience
- Microfocus Workbench, Dialog Manager, Cobol, C

We offer Competitive Benefits Please Contact:

PROFESSIONAL SOFTWARE CONSULTANTS, INC.

TAX FREE SAUDI ARABIA

TANDEM
COBOL, PATHWAY, TAL, SCOBOL, C, SQL, X.25

STRATUS
PL1, COBOL, C, ON/2

MUMPS
DSM, ISM, MSM, GTM, IBM RISC/6000. Powerbuilder. Fulltime/Consulting Positions available in the US/ABROAD

STRATEM

800-582-JOBS
TEL (212)967-2910
FAX (212)967-4205
124 W. 30th St. Suite #302
New York, N.Y. 10001

Nationwide Permanent Placements

TANDEM
East Coast/Mid-West/West Coast
Jr/Mid/Sr P/A's & S/A's
System & Project Managers
Banking, Brokerage, Telephony, Manufacturing, Comm & others
PATHWAY, SCOBOL, COBOL, Non-Stop SQL, TAL, C, SNAX, BASE-24, OLTP, OA, UNIX
Mail/Fax resume to:
Jerry Pitsenger

TALON
Professionals, Inc.
13028 Greg Roy Lane
Herndon, VA 22071
(703) 709-4191
FAX (703) 709-1437
Serving Only TANDEM Users & Professionals Across the U.S.

Every week Computerworld delivers more qualified job candidates than any other newspaper.

That's why more companies place more recruitment advertising in *Computerworld* than in any other specialized business newspaper.

To place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly. Regional. National. And it works.

An IDG Communications Publication

Midwest

IS PROFESSIONALS

Opportunities abound in the Southeast for talented, experienced (3 years minimum) Programmers, Senior PA's and DBA's. Join our talented staff and work in state-of-the-art environments on challenging projects.

- DB2, CICS, Cobol II
- CICS, APS, SQL
- PL/1, IMS DB/DC
- Cobol II, IMS DB/DC, Easytrieve +
- PL/1, Cobol II, IMS, DB2, CICS
- Cobol II, Gentran, IMS DB/DC
- IMS, Cobol, M & I (Case Laser)
- Natural, ADABAS, Cobol, CICS, DOS/VSE
- VAX, FORTRAN, INGRES (4GL), ABF
- PC Configuration, TCP/IP, Token Ring, Novell, DOS, Unix
- Novell Net
- Powerbuilder, Sybase
- IDMS, CICS
- RDARS

We offer excellent compensation, relocation assistance, full benefit package and education reimbursement. Send your resume TODAY!

AMERICAN COMPUTER PROFESSIONALS
140 Stoneridge Drive
Suite 350
Columbia, SC 29210
800-933-9227
FAX: 803-779-1955
Equal Opportunity Employer

PROGRAMMER ANALYSTS

Established consulting firm offering excellent salary and benefits package. Outstanding opportunities exist for programmer/analysts with experience in any of the following areas:

- IBM/ COBOL	- CSP	- SAS
- VAX/COBOL	- CICS	- HOGAN
- METAPHOR	- ORACLE	- SDK
- SYBASE/SQL	- DB2	- UNIX
- C	- IMS	

We have positions available both in the Pittsburgh and Washington, DC area.

For more information contact:

Pittsburgh Business Consultants, Inc.

Programmer Analysts

Career opportunity, challenging assignments & company stability. Seitmann, Cobb & Bryant, Inc. can offer you this and more. Immediate opportunities exist within our locations throughout the country for individuals possessing either:

• PC EXP.	• IMS DB/DC	• VAX/COBOL	• INGRES
• C, C++	• COBOL	• CASE TOOLS	• AS400
• ORACLE	• CICS	• DB2	• RPG
• TELON	• IDMS	• INFORMIX	• TCP/IP

We also offer a comprehensive insurance package, employee stock option plan & a 401K program.

Take your first step toward making your career complete by calling/sending your resume to:

Seitmann, Cobb & Bryant, Inc.
1365 W. Briarbrook Road
Memphis, TN 38138
1-800-221-1640
Fax: 901-754-8463 EOE

PC Programmer

We are a successful, growing firm offering talented professionals personal growth in a unique, team-oriented environment. We have an outstanding opportunity for an experienced PC Programmer to join us in our downtown Detroit headquarters.

To qualify you must have Bachelor's degree in Computer Science or a related field, plus a minimum of two years' experience with FoxPro, Clarion, Paradox and/or Progress. AS/400 knowledge is preferred.

We offer a competitive salary and outstanding benefits. To apply, send your resume, including salary requirements, in confidence to: **Programmer, P.O. Box 02208, Detroit, MI 48202.** Equal Opportunity Employer

IMS OR DB2

The DCW Group has several projects nationwide for qualified IMS or DB2 professionals in the following areas:

- **Systems Programmers**
- **DBA's**
- **Data Analysts**

For immediate consideration, fax or send resume to THE DCW GROUP, 5390 Peachtree Industrial Blvd., Ste 2010, Norcross, GA 30071. (404) 368-0713.

SENIOR SOFTWARE ENGINEER-MULTIMEDIA DATABASES. Design, implement, document and maintain software for multimedia databases and image synthesis. Design and develop software for components of operating systems. A Master's Degree in Computer Science a minimum prerequisite. Applicant must have a proficient knowledge and be able to use "C" and 68000 Assembly programming languages. Graduate level coursework or experience in Database design and Image Synthesis required. Systems level knowledge of UNIX or UNIX-like operating systems necessary. 40 Hrs./wk., $35,875 a year. Must have proof of legal authority to work in the United States. Send your resume to Job Service of Iowa, 150 Des Moines Street, Des Moines, Iowa 50309. Refer to Job Order IA1100220. This advertisement is paid for by the employer.

Programmer/Analyst. Southern Wisconsin printing company seeks Programmer/Analyst. Duties will be to create or modify software programs, analyze and rewrite programs to increase operating efficiency, test and debug existing programs, install software systems purchased from outside vendors, maintain systems, provide technical assistance to program users, and oversee installation of hardware and software. Requirements include • B.S. or B.A. in Computer Science or equivalent and the following periods of experience: at least 3 years experience as a programmer/analyst, 18 months experience with VMS operating systems, 12 months experience in RDB, 12 months experience in SQL programming; 6 months experience in Artificial Intelligence Applications. All experiences may be simultaneous. Salary is $36,500 annually for a 40 hour work week. Monday through Friday. Applicants should contact Waukesha Job Service, Attention: Gil Martinez, 141 N.W. Barstow, Waukesha WI, 53188. Job File No. 930192

ANALYSTS/ PROGRAMMERS

One of the South's fastest growing computer firms is seeking exceptional IS professionals. If you are looking for a people-oriented company offering diversity, challenge, & growth, then look no further. Candidates with 1 or more years exp. in any of the following areas should apply immediately:

- EDI
- Imaging
- KBMS
- SYBASE
- UNIX, C++
- Visual Basic
- POWERBUILDER
- ADABAS/NATURAL
- APS, DB2 or IMS
- DB2, CSP or CICS
- IDMS/ADSO, CAS
- MVS Systems Prog.
- TERADATA
- AS/400, Dev.
- Client Server
- C++, Windows
- SYSTEMATICS

Outstanding compensation, full benefits & relocation assistance. Opportunities available in NC, SC, Dallas & Atlanta. Send resume to:

SOFTWARE DATA SERVICES
4600 Park Road, Suite 300
Charlotte, NC 28209
(704) 521-8077 • (800) 521-8077

PROGRAMMER ANALYST - To execute detailed systems/software specifications, perform requirement analysis design application system, Develop software code and perform testing, debugging conversion and implementation, Maintenance of online and batch manufacturing, Commercial/Accounting applications using software Dbase III, COBOL on IBM PC compatible computers, Develop user and technical documentation, Provide technical assistance to clients by training and post implementation support. Req'd: Bachelor's degree or equivalent in Accounting & Auditing or Computer Science or Computer Information Systems, 2 yrs. exp. in the job offered or 2 yr. exp. in related occupation as Computer Programmer and/or System Administrator; Exp. must include development of accounting systems in COBOL and Dbase ®, programming, implementation client training. 40 hrs/wk 8:00 a.m. -5:00 p.m., $32,000/year. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. # 56593. "Employer Paid Ad"

Southeast

Computer Consulting Group has immediate openings on its southeast consulting staff for talented Programmer/Analysts. We're especially seeking:

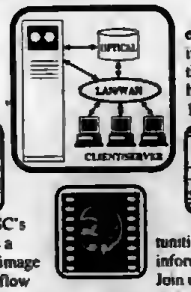
- **IMS or CICS or DB-2**
- **APS or CSP**
- **SAP - R/3**
- **Oracle or Ingres**
- **Unix System Manager**
- **Banking Business Analyst**

Computer Consulting Group
Contract Professional Services

4109 Wake Forest Rd.
Suite 307
Raleigh NC 27609
1-800-222-1273
FAX (803)738-9123
Member NACCB

BOSTON OPPORTUNITIES

Our Leadership in Image Systems Technology Can Enhance Your Career.



From its leadership position in Applied Information Technology, TASC is aggressively penetrating the commercial marketplace with an expanding suite of advanced technology products. Our Image Systems Integration Division, one of TASC's fastest-growing groups, provides a family of advanced, high speed, image compression and graphical workflow control products. The products created by this team have made TASC an acknowledged leader in image systems integration. Our imaging solutions are installed in many of the high growth industries of the 1990s: medical imaging/ healthcare; financial services; publishing, and criminal justice. Our rapid growth has created several opportunities for talented software and information systems professionals. Join us in developing the next-generation of high performance client/server imaging applications.

SOFTWARE ENGINEERS

Create leading edge imaging applications on a variety of computer platforms including PCs, Macs, and RISC workstations. Focus on developing client/server applications using Microsoft Windows, Windows NT, and UNIX SQL databases. Software positions are open for creating imaging applications in C/C++; developing SQL database applications with Informix, Sybase, Oracle, and other leading relational database management systems; integrating imaging system components such as scanners, printers, fax, and OCR; creating workflow applications; and developing graphical user interfaces with state-of-the-art development tools. BSCS or MSCS and strong skills in C programming, especially with PC compilers. Experience with SQL programming (especially on UNIX systems), Programmers Workbench, Microsoft Windows SDK, and GUI development kits. Network experience and workflow experience a plus. **Send resumes to Dept. GLP/CW.**

OTHER SOFTWARE ENGINEERING OPPORTUNITIES

In addition to the positions listed above, we have opportunities in several of our development groups. We seek seasoned engineers with experience in • GUI development • OS/2 • Presentation Manager • C/C++ programming • OSF/Motif • UNIX • X-Windows. **Send resumes to Dept. BBD/CW.**

We work in a superb facility in a North Shore suburb of Boston, just 20 minutes from the city. This is an area noted for its quality of life, with excellent school systems and world class cultural, educational and recreational opportunities.

At TASC, you'll find a professional, small team environment which fosters independent thought and expression. We offer an excellent salary and benefits program, but even more significant are the challenges and professional rewards waiting for you. Please forward your resume, including salary history, to the appropriate Department listed above at TASC, Human Resources, 55 Walkers Brook Drive, Reading, MA 01867. Fax: 617-942-7100. Email: SGCYR@TASC.COM An Equal Opportunity Employer, M/F/D/V. U.S. citizenship required.

TASC

Oracle DB2 • IMS

TEAM Information Services has several immediate openings in Florida, the Carolinas and Atlanta.

TEAM
Information Services
P.O. Box 952383
Lake Mary, FL 32795
800-676-TEAM
407/324-8566 (fax)
Member NACCB

SYSTEMS/PROGRAMMER ANALYST

The Louisiana Workers' Compensation Corporation, an independent mutual insurance company, has employment opportunity for Systems/Programmer Analyst in our Baton Rouge office.

For consideration applicants must have:

- Relational Database Management System Design experience preferably with ORACLE on VAX/VMS Systems including SQL*FORMS 2.3, 3.0
- "C" programming experience
- BS or AS degree in Computer Science or Mathematics preferred

Qualified candidates seeking the challenge and opportunity of being part of a developing organization may submit resumes in confidence to:

Human Resources Dept., LOUISIANA WORKERS' COMPENSATION CORPORATION, 2237 South Acadian Thruway, Suite 102, Baton Rouge, LA 70808. An equal opportunity employer

Midwest

PROGRAMMER ANALYST (REF. #311183) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analyzing, designing, developing & implementing comp s/ware for clients' EDP sys, incl analyzing, designing & developing integrated billing sys. Responsibilities incl meeting with users to gather reqs, create design, detail program specifications & tech support. Technical support on Unisys A Series mainframes & IBM 3090 w/MVS/XA, VSAM, CICS, DB2, COBOL II, QMF, SPUFI, PROEDIT, XPEDITOR, FILE-AID, LINC II, DMS II & COMS. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. REL EXP: in whole or in part, development of integrated sys & app s/ware, & using UNISYS A mainframe, UNC II, DMS II, COMS, & exp or training in MVS, VSAM & DB2 under IBM environment. Pay is $34,000/yr. 40 hrs/wk.

SYSTEMS ANALYST (REF. #312639) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analyzing, designing, developing & implementing comp s/ware for clients' EDP sys. Specific responsibilities will incl the design & analysis of communication & enhancement of CHORUS (UNIX based) distributed OS. Will also design, develop & implement assigned features in NFS, RFS & NET5000 on UNISYS machines; providing clients with solutions & fixes to problems in SVR 3.2 UNIX on 5/400 machines & providing tech services & support using the following: S8400 RISC (UNISYS S4640, ARIN 5000/80-90, NCR 3000/30-35, UNIX SVR3 & SVR4, CHORUS MICRO KERNEL, NET 5000 TCP/IP DEVICE DRIVERS (DOS/WCI, C, C++, Assembly Language of S8100, 68020 & 68040 processors. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the required ed & exp. REL EXP: in whole or in part, design, implementation & tech services; & using UNIX SVR3, TCP/IP, C & Assembly Language. Pay is $34,000/yr. 40 hr/wk.

SYSTEMS ANALYST (REF. #320803) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analyzing, designing, developing & implementing comp s/ware for clients' EDP sys. Specific duty includes designing & developing business solutions for clients' Information Network. Responsibilities will incl sys design, functional specifications development or convert the existing Network data maintained in IMS Databases w/ DB2; designing, maintaining & installing LANS subsystem which will deal with lines, modems & circuits of the network & its used for ordering, billing & accounting; & performing unit & functions testing using IBM 3090 MVS/ESA VM/SP, DB2, CICS, SDF & PL/I, CSP, IMS INTERTEST & various existing tools. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the required ed & exp. REL EXP: in whole or in part, design & development of comp network app programs, billing & accounting apps; sys installation & using IBM 3090, MVS/ESA, CICS, DB2, SDF & CSP & PL/I. Pay is $34,000/yr. 40 hr/wk.

SYSTEMS ANALYST (REF. #340803) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analyzing, designing, developing & implementing comp s/ware for clients' EDP sys, incl designing & developing specifications & enhancements to integrate existing on-line app sys. 1 specific duty is to analyze existing OES (IMS DB/DC based on-line appl) & OE2 (CICS & IMS/DB based on-line appl), order entry sys & their MIS based data repository. Responsibilities incl studying the existing sys (OES & OE2), writing business process documents about existing sys, comp s/ware for IOE using SDF, developing specifications for IOE, developing programs using PL/I, CICS, & DB2, writing unit test cases, testing programs, performing sys test & integration test using IBM 3090 with MVS/ESA environment. PL/I, CICS, DB2, IMS, OMF, SDF, ISPF, TSO & BOOKMASTER. ED & EXP: Bachelor's in Comp Sc, Math, Engg or Sys Anal & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg, Systems Engineer or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the required ed & exp. REL EXP: in whole or in part, designing or development of comp s/ware for clients' EDP sys, incl analyzing, designing, developing & implementing comp s/ware for clients' EDP sys, incl analyzing of user requirements, design of real-time Production Management & Control sys and development of s/ware modules interacting with CIMPLICITY. Responsibilities incl administering the production sys, on-line distributed network database, operating & spawning the production control pkg running on a multi-vendor platform integrated under DECnet/Ucs- TCP/IP using VAX/ VMS 5.4-2, DMO, PMX, C, RDB, SQL/MODS, CIMPLICITY, Ultrix, DECdatatrieve, DEC Message Queue, VDO, COO, DECnet/SNA-LU6.2, DEC-windows & Rally. ED & EXP: Bachelor's in Comp Sc, Math, Engg or Sys Anal, & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. REL EXP: in whole or in part, development of app sys, & using VAX, VMS, Ultrix, RDB, DECmessage QUE & DECdecision. Pay is $34,000/yr. 40 hr/wk.

ASSISTANT PROGRAMMER ANALYST (REF. #50790) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analyzing, designing, developing & implementing comp s/ware for clients' EDP sys incl analysis, design & development of automated social welfare sys. Responsibilities incl analysis & design preparing functional & tech specifications, development, testing & maintenance of app s/ware, & interact with user for enhancement & changes in the sys using IBM 3090, MVS/ESA, IBM PCs, IMS DB/DC, COBOL2, TELON, GAMYAN Sys Vinds LAN, Microbasix Workbench & MSWORD, TSO, ISPF/PDF, CLISTS, DIALOG MANAGER, JCL, EXPEDITOR, & COBTEST. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 1 yr exp in the job offered or 1 yr exp as Sys Anal, Sys Prog, Prog, Prog/Anal, S/ware Engg, Consultant or Assistant Sys Anal. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. REL EXP: in whole or in part, analyses, design & testing app sys & using IBM 3090, IBM PCs, MVS, IMS DB/DC, TSO/ISPF, JCL, CLISTS, Dialog Management Services & COBOL II. Pay is $34,000/yr. 40 hr/wk.

SOFTWARE ENGINEER (REF. #S3793) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analyzing, designing, developing & implementing comp s/ware for clients' EDP sys. Duties incl design & develop real-time event-driven s/ware for control sys which incl development of networking s/ware using error free ethernet type protocol with node interface to receive data packets from satellite, develop s/ware for Motorola 68000 h/ware in 'C' & assembly language on UNIX & MS-DOS environments, designing window mapping for user friendly front ends & simulation s/ware for fine tuning & performance analysis. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. REL EXP: in whole or in part, development of real time & control sys, networking s/ware, device drivers & window manager sys, fine tuning & performance anal & using UNIX, MS-DOS, assembly & C. Pay is $34,000/yr. 40 hr/wk.

PROGRAMMER ANALYST (REF. #51902) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analysis, design, development & implementation of comp s/ware for clients' EDP sys incl an Integrated Transportation System for large organization. Responsibilities incl process-data flow design, data modeling identification, tech support & overall design of app entry part or sys & meetings with user to gather reqs. Tech support for design of apps using CICS & DB2 on IBM 3090 using IBM 3090, MVS/ESA, DB2, CICS, COBOL & TSO, & VSAM. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. Related exp must have incl, in whole or in part, developing comp s/ware using IBM 3090, MVS, DB2, CICS, TSO, VSAM & COBOL or COBOL II. Pay is $34,000/yr. 40 hr/wk.

SR SOFTWARE ENGINEER (Ref. #52093) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analysis, design, development & implementation of comp s/ware for clients' EDP sys and design & development of device drivers for communication controllers under multiple OS platforms; design & development of firmware, device drivers, UNIX kernels, & UNIX internals; debugging using ICE, ADB and SDB; and remote support through Wide Area & Local Area networks, & using Unisys UNIX platforms, TCP/IP, Informix 4GL, ESQL & C, UNIX tdrs, SVR2, SVR3, SVR4 Xenix, VERADOS & SIRIS. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Sys Anal, Sys Prog, Prog, Prog/Anal, S/ware Engg, S/ware Development Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. Related exp must have incl, in whole or in part, design & development of app sys and development device drivers, & UNIX internals. UNIX tools, firmware design of controllers, & using OS platform, UNIX SVR2, SVR3, SVR4 TCP/IP, ADB, SDB, VERSADOS & SIRIS. Pay is $34,000/yr. 40 hr/wk.

PROGRAMMER ANALYST/SOFTWARE ENGINEER (REF. #52193) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analyses, design, development & implementation of comp s/ware for clients' EDP sys and a banking sys. Duties incl sentence, support & maintain LOANS app and ability to carry out special projects to meet growing LOANS portfolio & needs of user community using UNISYS A Series, COMS, DMS II, DMINQUIRY, ERGO, CANDE, COBOL, WFL, & other UNISYS sys s/ware. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Assistant Sys Anal/Prog, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the required ed & exp. REL EXP: in whole or in part, app design, maintaining & supporting banking sys, & using UNISYS A series s/ware DMS II, CANDE, WFL, DMINQUIRY & COBOL. Pay is $34,000/yr. 40 hr/wk.

SYSTEMS ANALYST (REF. #52293) to consult with clients to ascertain & define their business reqs or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analysis, design, development & implementation of comp s/ware for clients' EDP sys. Duties incl: design & development of on-line Purchase Order, Inventory Control & Health Care Sys. Duties require using Unisys A Series, COMS, GEMCOS, DMSII, COBOL & ALGOL. Languages: ERGO, SDF Plus & ANDROID. UNIVERSE (4GL CASE Tools) on UNIX h/ware. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. REL EXP: in whole or in part, app sys design development and health care inventory control & purchase order sys, & using UNISYS A Series, COMS, GEMCOS, DMS II, COBOL, ALGOL, ERGO, SDF Plus, ANDROID & UNIVERSE. Pay is $34,000/yr. 40 hr/wk. Please send resume to 7310 Woodward Ave., Rm 415, Detroit, MI 48202 & include Ref #. Employer Paid Ad.

Technical Services Systems Software Coordinator: (Minn.) design & implement special software req'd by users & applications developmt personnel; install, implement, test & document new software & modifications to existing software; monitor performance & capacity of current system & enhancements; provide tech'n l ass't & direct Computer Operations, Production Control & Applications Development Depts & advise optimum use of computer resources; estab & present applicable training programs for use of new & existing hardware/software; participate in planning testing & approp implementation of disaster recovery procedures; develop & manage multi-site communications network; coord problem determination w/hardware/software suppliers & applicable users; coord remote help desk problem determinat & approp software upgrades; develop & enforce standards to maintain system compatibility; research & propose new software to satisfy in-house processing needs; develop procedures necessary for implement. of hardware/software conversions; & provide approp security to ensure system & data integrity. 1 yr in job or 4 yrs as Systems Programmer/Analyst. Must have specific exper in installation, customization, support & performance factors for major mercharvelse retailer using IBM DB2, OMF, CICS, OS/VS, V2, Compuware CICS Abend-Aid, Debug-Aid, Playback, Radar, Simulcast and File-Aid for DB2, Langmark Monitor for CICS, BMC DB2 Activity Monitor and SuperOptimizer for CICS, Levy & Shoop VPS/DRS, Omegamon for CICS, Wizard EM Naperwood, ETC, & 'Eyewitness' & background/knowledge of IMS, TSO, SMP/E, ISPF, JCL, NETVIEW, CICS, NCP, VTAM, NPM, RMF, Inform, Management System, SMS and DFHSM. Omegamon II for MVS, Computer Associates, CA-1 Tape Management System, CA-7 Scheduling System, CA-11 Job Restart System & CA-Dispatch Report Distribution System. 40 hrs/wk. $49K. Send resume and letter in duplicate to: D.J. Reams, Case No. 930207, Milwaukee North Job Service Office, 6087 N. Teutonia Ave., Milwaukee WI 53209.

SENIOR ENGINEER - COMPUTER APPLICATIONS

Develops non-linear finite element program for as springs to do stress analysis and frequency response calculations, static and dynamic finite element modeling of as springs, pistons, marshmallows and bumpers, critical dimensions load carrying capacity of as springs. Experience and/or education must include integration of non-linear mechanics principles to develop finite element models of composite structures and the writing of own computer programs for static and dynamic applications involving large deformation with contact. Ph.D. is required in Engineering Mechanics w/ two (2) years research experience. 7:30 a.m. to 4:15 p.m. Salary of $48,600/yr. Send resume w/ social security number to Indiana Department of Workforce Development, 10 N. Senate Ave., Indianapolis, IN 46204, Attn: Gene R. Replogle. Equal Opportunity Employer. I.D. #3286573.

A SYSTEM OF EXCELLENCE

Information Systems Careers

We're Mercy Information Systems, a subsidiary of Mercy Health Services and part of the Sisters of Mercy Health Corporation. If you're a results-oriented information systems professional consider joining our dynamic organization.

MID-RANGE

Programmer/Analyst

- 3-5 years experience
- Background in an S/38 or AS/400 environment
- RPG III and CL proficiency
- Outstanding analytical skills
- Patient care billing system support, and GTE application experience preferred

Financial Systems Consultant

- Minimum 3 years and user or system analyst experience
- Thorough knowledge of financial applications
- General ledger and/or cost accounting experience is preferred

MAINFRAME

Revenue Systems Consultant

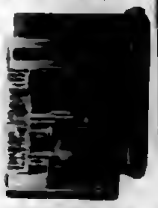
- Five years in the healthcare field
- Solid business knowledge of medical records, patient accounting and patient registration applications
- Experience in implementation and/or support of HealthQuest software products is preferred.

We offer a highly competitive salary and benefits package. For consideration, please send your resume to: MERCY HEALTH SERVICES, CO#88, 34888 Twelve Mile Road, Farmington Hills, MI 48331-3221. Achieving Workforce Diversity Through Affirmative Action/Equal Opportunity Employer

Attention, IS Directors!

Recruit computer professionals in the one newspaper that reaches more QUALIFIED professionals than any other newspaper: *Computerworld.*

For more information or to place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).



Weekly. Regional. National. And it works.

An IDG Communications Publication

TECHNICAL STAFF - ELECTRICAL ENGINEERING - MS in Electrical Engineering. One year experience in the job offered or one year experience as a Research Assistant. Experience should include digital logic and microprocessor use in a closed-loop application; C, FORTRAN, PASCAL, and BASIC language programming with both UNIX and VMS operating systems, and digital and analog circuit simulation, including the use of SPICE, and software techniques in connection with control system applications.

Designs and develops hardware and software for computer-based control systems, data analysis and manipulation, and other electrical and mechanical support systems as required for the Advanced Photon Source project. Provide optimal choices of hardware devices and circuits in a fast-changing field. Produces software to test and operate computer interface systems. Works independently with minimal supervision as well as in team-effort situations.

Salary: $3,198.9/-40 hours per week/@ 30 a.m.-5:00 p.m. Must have proof of legal authority or work permit recognized in the U.S. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street, 3 South, Chicago, Illinois 60605. Attention: MAXINE COUNTS. Reference #V-IL10656C. NO CALLS. AN EMPLOYER PAID AD - SEND 2 COPIES OF RESUME.

SOFTWARE DESIGN/PROGRAMMER - Write Source codes to meet application specifications, prepares written documentation, test work according to department standards. Assist users with questions and problem resolution regarding their applications; assists in development of departmental standards. Salary, $30,500 per year, 40 hours per week (8:30 a.m. - 5:00 p.m.) Requirements, Bachelor of Science in Computer Science or Information Systems or equivalent, must have completed at least one university level course in each of the following: System Analyses and Design, Database Management Systems, Data Networks. Six months experience or related occupation as a Co-op student or part time employment as a Computer Programmer, experience must include programming in a VAX/VMS environment and programming with Paradox, DBMS and a major RDBMS. Must have proof of legal authority to work permanently in the U.S. Send two copies of resume to: IDES, 401 South State Street - 3 South, Chicago, IL 60605, ATTN: Gordon Dotter. Ref #V-IL 10340-G. No calls please. Geographical area of employment (For West Chicago Area Suburb) Employer paid ad.

SOFTWARE ENGINEER-GRAPHICAL USER-INTERFACES: Design, develop and maintain cross-development computer software tools which ease the development of software applications for the OS-9 real-time operating system. Such tools are to be based on industry standard graphical user-interface specifications protocols, such as the X Window system and MOTIF on the UNIX operating system. Bachelor's Degree in Computer Science required as a minimum. Graduate level course work or two years experience with developing X Window and MOTIF applications and knowledge of client-server architecture necessary. Also knowledge an computer operating systems with a strong background in UNIX required. A proficient working knowledge and experience in the use of 'C' programming language is necessary prerequisite. 40 hrs/wk., $35,200 a year. Must have proof of legal authority to work in the United States. Send your resume to Job Service of Iowa, 150 Des Moines Street, Des Moines, Iowa 50309. Refer to Job Order IA 1100219. This advertisement is paid for by the employer.

Systems Analyst/Programmer to develop and design, construct, implement and maintain software and develop procedures to ensure operation of the Voice Response Unit network. Implement system design in C-language in UNIX network environment platforms. Responsible for computer program design, coding, documentation, testing as well as installation. Consult with users and vendors to establish system requirements and resolve problems of end users. Create and maintain a trouble-shooting log as well as trouble-shoot problems in systems. $30,000-$34,450/yr. 40 hrs/wk. B.S. in Computer Science and 1 yr. experience as computer programmer (experience can be gained in a job before degree) plus experience in using UNIX networking environment, 'C' language and TCP/IP protocol. Experience with Local Area Network (LAN). Send resume to: Nebraska Job Service, 550 South 16th Street, P.O. Box 94600, Lincoln, NE 68509. Refer to Job Order No. NE 0088130.

Hiring Managers

Recruit qualified computer and communications professionals with the *IDG Communications Computer Careers Network* of live leading computer newspapers. For more details. Call Lisa McGrath at:

(800) 343-6474
(In MA, 508/879-0700)

Looking for qualified computer professionals?

Look no further. More than 629,000 computer professionals read *Computerworld* every week. And you can reach all of them -- or just the ones in your region -- with a regional or national recruitment advertisement in *Computerworld's Computer Careers* section.

For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700); or call your local sales office listed below:

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Nancy Perceval, 508-879-0700.

NEW YORK: Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662, Valerie Galbo, 201-587-0090.

WASHINGTON, D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031, Katie Kress, 703-573-4115.

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, Patricia Powers, 708-827-4433.

LOS ANGELES: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164.

SAN FRANCISCO: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164.

COMPUTERWORLD
Where the qualified candidates look. Every week.

Midwest

ANALYSTS/ PROGRAMMERS

One of the South's fastest growing computer firms is seeking exceptional IS professionals. If you are looking for a people-oriented company offering diversity, challenge, & growth, then look no further. Candidates with 1 or more years exp. in any of the following areas should apply immediately:

- EDI
- Imaging
- Kbms
- SYBASE
- UNIX, C++
- Visual Basic
- POWERBUILDER
- ADABAS/NATURAL
- APS, DB2 or IMS
- DB2, CSP or CICS
- IDMS/ADSO, CAS
- MVS Systems Prog.
- TERADATA
- AS/400, Dev.
- Client Server
- C++, Windows
- SYSTEMATICS

Outstanding compensation, full benefits & relocation assistance. Opportunities available in NC, SC, Dallas & Atlanta. Send resume to:

SOFTWARE DATA SERVICES
4600 Park Road, Suite 300
Charlotte, NC 28209
(704) 521-8077 • (800) 521-8077

PROGRAMMER

Shamrock Corporation, one of the leading gift wrap manufacturers in the nation has an excellent opportunity for a Programmer to join our staff!

Qualified candidate must possess UNIX operating systems experience. A good knowledge of INFORMIX data base and 4GL would also be a definite plus. The individual we seek must be a personable self-starter who would enjoy an informal work environment that allows for personal freedom.

We offer an excellent salary and comprehensive benefits package. If you would like to be associated with a company with quality products and caring people, please forward your resume with salary requirements to: Fred Williams, Human Resources Dept., Shamrock Corporation, P.O. Box 18247, Greensboro, NC 27419. Ph. (910) 674-4228. We are an Equal Opportunity Employer M/F/D/V

Over 629,000 computer professionals read Computerworld weekly.

FREE Bulletin Board

DP/MIS/IS Career Opportunities
Clients Companies pay ALL FEES
OVER 600 NATIONAL LISTINGS
Description of Jobs available
for Download PLUS other useful files DIRECT DIAL 24 HRS/DAY

813-495-1801 (8-N-1)
JACK DETURK
DP/MIS CONSULTANT
DP JOB WORKS
13431 BRIDGEFORD AVE
BONITA SPRINGS, FL 33923
TEL. 813-495-6605
FAX/BBS. 813-495-1801
COMPUSERVE 70744,3545

Call, Write OR Fax in Confidence

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

For over two decades, Computerworld has delivered qualified job candidates to America's employers.

And ever since Computerworld's first weekly issue in 1967, America's companies have relied on Computerworld to target America's most qualified computer job candidates.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

COMPUTERWORLD
Where the qualified candidates look. Every week.

TALLAHASSEE, FLORIDA & RICHMOND, VIRGINIA OPPORTUNITIES

FIRST HEALTH Services Corporation stands as a national leader in claims processing and managed care. Ours is a strong record of success with an emphasis on providing key expertise to America's largest industry—health care. Currently, we have excellent opportunities for experienced systems and programming professionals who wish to excel with us in Virginia or Florida.

- **Senior Systems Programmer**
- **Senior Programmer Analyst**
- **Programmer Analyst**

You may qualify with a degree in computer science (or the equivalent) plus 2-5 years programming/analysis experience and excellent communication skills. Abilities must include COBOL, IBM OS, JCL and VSAM. **Previous experience in Medicaid/health care claims processing strongly desired.**

We offer attractive salary and benefits including relocation assistance. For details and immediate consideration please send your resume with salary history to: **Human Resources, FIRST HEALTH Services Corporation, 4300 Cox Road, Glen Allen, Virginia 23060, Attn: Section MIS-FL (for Florida positions), Attn: Section MIS-R (for Virginia positions).** EEO, AA, M/F. We promote a drug free work place.

FIRST HEALTH SERVICES CORPORATION

Computer Opportunities

USAir, an innovative leader in the airline industry, seeks experienced software professionals in the following categories for its Operations Research Department which is located in Arlington, Virginia (just outside of Washington DC). This organization develops advanced decision support systems for all divisions of the airline.

Programmer
PC Airport Applications Development

Experienced with C, FORTRAN, graphics in PC environment, under both DOS and OS/2. Mainframe TSO experience helpful.

Object Oriented Programmer/Analyst
Revenue Management Application Development

OOC++, embedded SQL, and Smalltalk. Experience developing large client/server applications using relational databases under UNIX, and MS-Windows or OS/2 clients is desirable. (Positions are available at several levels.)

C/Database Programmer/Analyst
Revenue Management Application Development

Develop applications in C under UNIX using embedded SQL, and AIX to mainframe communications package. Working knowledge of relational database design and administration in a UNIX (4gen, AIX) environment also required.

USAir offers a competitive salary and a comprehensive benefits package including liberal travel privileges. For consideration, please send a resume with cover letter, indicating position of interest and including salary history and academic GPA to: USAir, Employee Relations Department (OS-CW), 2345 N. Liberty Street, Winston-Salem, NC 27105. EOE, M/F/H/V.

USAir

DIRECTOR, FINANCIAL SYSTEMS

LEADING THE WAY BY PUTTING QUALITY FIRST

Quality First

With an increased emphasis on customer satisfaction quality initiatives, the Harris Semiconductor Sector has introduced more than 240 new products designed to outpace the competition in an array of commercial, military and aerospace applications. We currently have a challenging opportunity for a Director of Financial Systems to direct the activities of the Financial Systems Department.

The successful candidate will be responsible for strategic planning, development, implementation, maintenance, and operation of worldwide financial and human resources systems, with a special emphasis on activity-based management techniques. You will also be involved with the Sector's Total Quality Management initiatives. Applicants should have 10+ years of relevant work experience, as well as a BS in a related discipline; an MBA or equivalent is highly desired.

Our Fortune 200 company maintains a well-recognized leadership position because of our ability to attract and retain quality-focused professionals. If you are committed to performance excellence, submit your resume/salary requirements to: Harris Semiconductor, Human Resources, MS53-010, Dept. CW/0816, P.O. Box 883, Melbourne, FL 32902. We are an equal opportunity employer M/F/D/V.

HARRIS

COME SHARE OUR VISION! OUR ROOTS ARE IN TELECOMMUNICATION!

As the third largest data processing company in the United States, GTE Data Services has immediate technical openings from Programmer to Senior Advisory Systems Engineer.

Professionals with experience in several of the following areas are preferred:

TECHNICAL SKILLS:

IBM

- COBOL/COBOL II
- CICS
- IMS
- DB2
- JCL
- SQL
- IBM Utilities
- Data Base Methodologies
- Knowledge of Communications (X.25, SNA, etc.)

SPECIAL SKILLS:

- NETWORK ACCESS
- Billing business operations and/or billing systems
- Structured techniques and design methodologies
- Requirements analysis techniques
- Strong testing skills
- Curriculum Development
- Foreign travel for extended periods is required in some positions

DEGREE:

- BS/BA in Computer Science or equivalent work experience

We are dedicated to providing the highest quality telecommunication services to our customers. Our management recognizes that GTEDs is only as strong as the combined talent and dedication of its information technology professionals.

If being involved with truly challenging opportunities in telecommunication appeals to you, then send a detailed resume with salary history and requirements to:

GTE Data Services
Attn: N. Kessel (BIF)-(CW)
P.O. Box 290152
Temple Terrace, FL 33687-0152
EOE M/F/D/V

GTE

ASSOCIATE SYSTEMS PROGRAMMER

Provident Life and Accident Insurance Company – a national leader in providing insurance, employee benefits and related financial services - has an opening in our corporate headquarters for an Associate Systems Programmer involving systems programming and administration for IBM's MVS/VS. Chattanooga is located in a region within a day's drive of 75% of U.S. major markets which are Atlanta, Birmingham, Knoxville, Huntsville, and Nashville.

Preference given to individuals with the following qualifications:

- Prior systems programming experience in an IMS or DL/I environment
- Proficiency in vendor software installation and maintenance
- Knowledge of MVS operating environment
- Knowledge of DL/I database preferred
- Assembler language programming useful
- IBM personal computers, especially OS/2 experience highly desirable
- CICS/VS, IDMS/R or DB2 subsystems experience highly desirable
- Excellent human relations and communications skills
- Willingness to provide 24-hour on-call support

We offer a good, flexible benefits package and competitive salaries. If you are interested in working in a challenging environment, please submit your resume in confidence to:

Provident Life & Accident Insurance Co.
Attn: ASP
P.O. Box 160109
Chattanooga, TN 37401-7109

PROVIDENT COMPANIES

An Equal Opportunity Employer M/F

Virginia Commonwealth University -
Family Practice Department

Coordinator of Information Systems
Instructor

Incumbent will serve as a key interface for faculty and students to maintain and develop medical informatics systems, support a statewide physician manpower study and various federally funded research projects.

Requirements: Advanced degree in computer science, math science or information systems. Experience coordinating multiple projects, working with very large systems and selecting technical solutions for the design of computerized systems for medical application. Must possess good analytical and problem solving skills, good communication and interpersonal skills, ability to make independent decisions. Proficiency in PC-DOS, dBASE and SAS and knowledge of VAX/VMS and MVS/TSO required. Experience working with students, university faculty and physicians preferred.

Virginia Commonwealth University is an Equal Opportunity/Affirmative Action Employer. Women, minorities and persons with disabilities are encouraged to apply. Please send CV's to C. Jeter, Box 251, Richmond, VA 23298-0251

Recruit top talent regionally or nationally with Computerworld

You can recruit qualified computer personnel accross the United States when you place your advertising in *Computerworld*.

That's because *Computerworld* gives you your choice of regional or national editions to deliver your recruitment advertising message. And because you'll reach more than 629,000 computer professionals every week – including the nation's top talent.

Call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

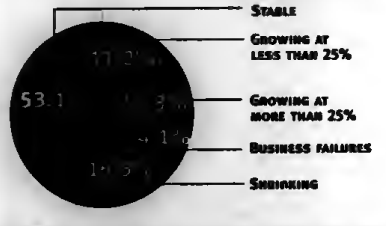
Weekly. Regional. National. And it works.

An IDG Communications Publication

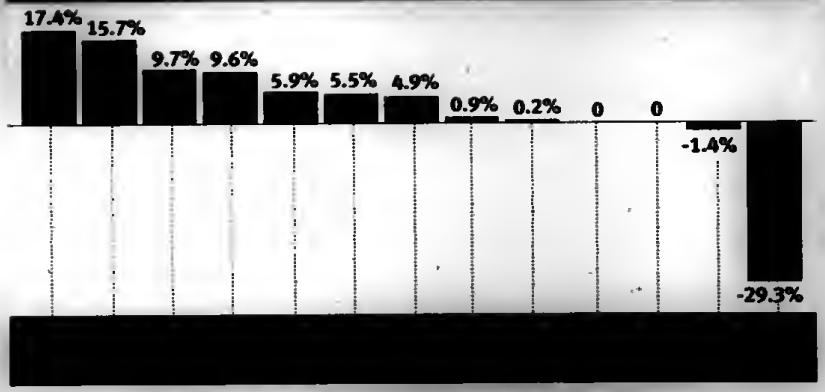
CAREER SURVEY: Insurance software

INDUSTRY HIRING TRENDS

OVERALL GROWTH RATE



REGIONAL GROWTH ANALYSIS



CorpTech, a directory publisher based in Woburn, Mass., tracks the U.S.' 35,000 technology manufacturers. This survey relates to the 24,585 tracked firms with less than 1,000 employees.

© Copyright 1993, Corporate Technology Information Services, Inc., Woburn, Mass.

CA & AZ Contracts

P. Murphy & Assoc.
4405 Riverside Dr. #100
Burbank, CA 91505
(818) 841-2002
FAX (818) 841-2122
Member NACCB

CONSULTANTS
needed by AIC, an international consulting firm. Over 35 locations servicing our Fortune 500 clients, with openings in a wide range of technologies. We offer a competitive compensation package as either a project basis, or salaried position with comprehensive benefits for individuals with 2+ years professional experience. BOE. Send or fax your resume to:
Analysts International Corp.
P.O. Box 39612
Minneapolis, MN 55439
Fax (612) 897-4544

SENIOR SOFTWARE ENGINEER - 40 hrs./wk., 8am-5pm, $48,070/yr. To analyze, design and develop computer software application systems. Develop technical proposals, program specifications and test data. Require Bachelor's degree in Computer Science or Electronics/Communications Engineering, 6 yrs. expr. in job offered or & yrs expr as Programmer/Analyst. Experience in systems analysis and design utilizing VAX/VMS, C, INGRES and ORACLE software. "Employer paid ad" E.O.E. Send resumes to 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref No: 58693.

SENIOR SOFTWARE ENGINEER - 40 hrs./wk., 8am-5pm, $48,070/yr. To analyze, design and develop application software on the IBM PS/2 and transfer to mainframe utilizing DB2 and CICS software. Prepare unit test plans and codes utilizing ADW and Workstation interactive test tools. Require Bachelor's degree in Computer Science, Engineering or Science (will accept 4 years of experience in lieu of degree), 6 yrs expr in job offered or 6 yrs. expr as Programmer/Analyst/Consultant. Experience in application software analysis, design and development utilizing MVS/ESA, COBOL, CICS, WAF and DB2. "Employer paid ad" E.O.E. Send resumes to 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref. No. 58693.

SENIOR SYSTEMS ENGINEER - 40 hrs./wk., 8am-5pm, $48,070/yr. To analyze, design and develop computer software application systems. Provide quality assurance, system testing, problem resolution and user interaction. Require Master's degree in Computer Science, Engineering, Operations Research. 5 yrs. expr. in job offered or 5 yrs. expr as Analyst Programmer. Experience in systems analysis, design and development of application software under MVS/ESA utilizing CICS, DB2, COBOL and CSP AD/AE. "Employer paid ad" E.O.E. Send resumes to: 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref. No. 58693.

IMMEDIATE
permanent and contract positions available. 3+ yrs experience required:
IBM Mainframe and Banking applications
AS400: RPGIII, COBOL
PICK & related software
UNIX, "C", C++
Please send resumes to:
Creative Data Corp
8700 S.W., 105th
Suite 311N
Beaverton, OR 97005
FAX: (503) 646-1118

Project Development Coordinator. Omaha, NE. Analyze user needs & provide tech support. Dsgn, dvlp, troubleshoot & coord prjs. Coord & write specs. Use DB2, APS, DOS/VSE, CICS & DW/370 with CICS on IBM mainframe comptb. Provid tech supp on IBM mics & dvlp specs & codes in COBOL, MVS CICS, FOXBASE, XENIX, DBASE III & IBM-PC compatible LANs. Eval workload & capacity of compl syst to determ feasibility of expanding/enhancing compt opers'ns. Eval & test vendor supplied s/ware on mframe & minicomps. Write prj rpts & docs for new/mod/d s/ware & h/ware. Bach in Electronics or Syst Eng or Tech w/two yrs exp in job offered or two yrs exp as S/ware Eng or Programmer (Consultant). Must hv one yr exp using DB2, APS, DOS/VSE, CICS & DW/370 with CICS on IBM mainframes. Must hv one yr exp in provid tec supp on IBM mic & dvlpng specs & codes in COBOL, MVS CICS, FOXBASE, XENIX, DBASE III & IBM-PC compatible LANs. $47,500/yr, 40hrs/wk, 8 am-5 pm. Must have proof of legal authority to work in the United States. Send your resume to Bernard Christensen, Nebraska Department of Labor, 550 South 16th Street, P.O. Box 94600, Lincoln, Nebraska, 68509. Refer to Job Order NE 0085191. This AD is paid for by the employer.

Colorado
Oregon
Arizona
Opportunities

Applications Development
- CICS/VSAM/COBOL
- VSAM/COBOL/Batch
- DB2/CICS or DB2/CSP
- Banking P/As
- AS/400, COBOL, SYNON, P/As
- QUALITY ASSURANCE ANALYSTS

Technical Support
DB2 and IMS DBA's
DB2 Systems Programmers
MVS/ESA Systems Programmers

DATRONICS, Inc.
Western Region
Recruitment Center
151 Kalmus Dr., Ste. C-200
Costa Mesa, CA 92626
Phone: (714) 751-3262
Fax: (714) 751-3902

CONSULTANTS FT
UNIX C - C
LOTUS NOTES
ADABAS NATL2
SAGE SOLUTIONS
Ph 212 714-2588 FX 714 2558
875 5th Ave #2305 NYC 10021

SOFTWARE ENGINEER - 40 hrs./wk., 8am-5pm, $43,000/yr. To analyze and develop computer s/w systems for manufacturing and administrative applications. Develop program specifications and test data, use advanced programming techniques to write complex programs. Req: Bachelor's degree in Computer, Electrical or Mechanical Engineering, 4 yrs. expr. in job offered or 4 yrs. expr as Systems Engineer/Analyst/Programmer. Experience in design & development of application systems utilizing the IBM 3090 or ES 9000, MVS/ESA, IMS, CICS, COBOL & TELCN. Employer is S/W consulting & development firm. "Employer paid ad" E.O.E. Send resumes to 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref No: 63693.

SOUTHEAST OPPORTUNITIES

Technology Consulting, Inc. is a dynamic and rapidly growing Software Development Company with challenging assignments. Our immediate and continuing needs are

SYBASE/CLIENT SERVER

TCI is a Regional Teaming Partner with SYBASE. We have three major projects and need experienced data processing professionals which include Programmer Analysts, Systems Analysts and Project Leaders. Knowledge of manufacturing applications or experience with SYBASE are strong pluses.

TCI offers competitive salaries, attractive benefits, and relocation assistance. For consideration, send resume or call

TCI TECHNOLOGY CONSULTING INC.
1800 Meidinger Tower Louisville KY 40202
(502) 589-3110 FAX (502) 589-3107
Member NACCB

Computer software company in Denver, CO seeks Software Engineer to design, develop, and test computer systems, applying principles and techniques of computer science, engineering, and mathematical analysis. Specifically develop database gateways for on-line relational database and object-oriented database systems as applied to computer open systems which use PICK, Oracle and Sybase database systems, using programming language C and UNIX and VMS operating systems. Develop integration technology including the use of Schema design and generation for third-party decision support tools, including GOL, GUPTA SQL Forest & Trees, and Personal Access. Requires Masters, Computer Science or related field, expertise in developing integration technology, including the use of Schema design and generation for third-party decision support tools, including GOL, Forest & Trees, and Personal Access, experience in working with Sybase open clients and open server technology. $45,000/year; 8:00-5:00pm, M-F. Respond by resume, to Colorado Department of Labor & Employment, 600 Grant Street, Suite 900, Denver, CO 80203. ATT: Rolando, and refer to Job Order No CO4316045.

ORACLE Programmers
Computer Data Systems, Inc., (CDSI) is a leading provider of support and services in the ADP industry. Recent growth has created multiple openings in the Colorado Springs, Colorado and New Orleans, Louisiana areas for Programmer/Analysts with a Bachelor's Degree and 1 to 5 years Oracle experience. Additional positions in New Orleans open for personnel with **Arc/Info** experience.

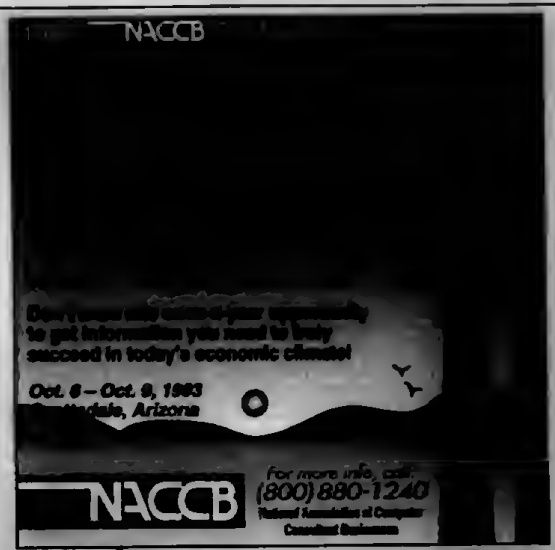
IDMS ADS/O Programmers
We are currently seeking a degreed **IDMS Programmer/Analyst with 2+ years ADS/O experience** for the Austin, Texas area.

Please submit resumes in confidence to: CDSI, HRD E-2155, Attn: Robert Miller, 610 Houston St., Suite 650, Ft. Worth, TX 76102 or **FAX: (817) 335-3631.** Ph 1-800-772-2374. EOE M/F/D/V

CDSI Computer Data Systems, Inc.
"Leadership is a Matter of Performance"

Development Staff Member (Boca Raton, FL). Architect, design and develop internals tools for the monitoring/management of software development on the IBM Operating Systems OS/2. Develop improved software development processes for the operating system. Investigate the overall framework of information systems in the OS/2 organization and integrate new tools. Ph.D. in Computer Science plus 1 year in job or 1 year as a Graduate or Post-graduate Research/Teaching Assistant. Must have background in Database Management Systems, including relational, hierarchical, & network database management systems, as well as database design & performance evaluation, & techniques for the storage & retrieval of unformatted database systems to include the development of new data structures & improving the performance of retrieval algorithms, together with distributed database systems, computer architecture & operating systems. Required background may be substantiated by course transcripts verification of research experience, or employment letter. 40 hr/wk; 8:00 a.m. - 4:30 p.m.; $80,320/yr. Applicants should submit resume to the Job Service of Florida, 2600 W. Oakland Park Boulevard, Fort Lauderdale, Florida 33311-1347. Reference Job Order #FL 0882118.

I S Pros
CAREERS SOLUTIONS
PERMANENT AND CONSULTANT POSITIONS
Pros & Sks To $80K
UNISACE ORACLE INGRES SYBASE
INFORMIX C/C++ OOP POWER
BUILDER OOD OOP Client Server
LAN WAN BANYAN NOVELL
UNIX OS/2 DOS VMS
CICS Prin To $90K
OOP COBOL
BANKING Prog Analysts To $55K
(AFS NOSAN EPCS SYSTEMATICS)
CASE To $57K
SA/RE/ER/W KEY BACHMAN
ORG Pros To $70K
COBOL DB/DC GUI
AS400 Pros To $40K
Additional openings available
CONTACT BRAD MOSES
INFORMATION SYSTEMS PROFESSIONALS
P O Box 41212
Raleigh NC 27629
(919) 954-9100
FAX (919) 954-1947



ACQUISITIONS

CONTRACT PROGRAMMERS
with the *LEADING EDGE*
RATES UP TO $80 Per Hour
SYBASE DBA
OS/2, C/C++ - P/M, EASEL
RUMBAUGH METHODOLOGY
CICS, DB2, CSP, APS
CICS, IDMS
AS/400/COBOL/ABI
ADABAS/NATURAL, C, TRS
WINDOWS, NOVELL, LAN
C LANGUAGE
SEND RESUMES TO:
J.P.S., INC
Two Mid America Plaza
Suite 800
Oakbrook Terrace, IL 60181
(800) 633-0301
Fax (708) 575-2956
No Trainees or part-time positions
Equal Opportunity Employer

SMART MOVE
Be Challenged Without Continually Changing Careers.
Make the smart move and join Computer People Unlimited! Because with CPU you can experience a wealth of exciting projects and technical challenges as you work with a variety of industries. We currently have opportunities for professionals with the following skills:

ASSEMBLER
AS/400 - COBOL
ADS/O
CICS
DB2
FOCUS
IDMS
INGRES
IMS DB/DC
PL/I
PROGRESS
SAS

If you'd like to be continually challenged without having to consistently change careers contact Bill Rudd, Joyce Mosetic or Julie Endlich at 414-225-4000, or call 1-800-527-8462 for Milwaukee, Madison, Green Bay and Appleton area opportunities. You may also send your resume in confidence to: Computer People Unlimited, Dept. CW-0816, 732 N. Jackson St., Milwaukee, WI 53202. Fax: 414-225-4011. Sorry, no entry-level positions are available. We are an equal opportunity employer.

CPU COMPUTER PEOPLE UNLIMITED INC.

NATIONWIDE
Contract & Permanent Jobs
- C++ / UNIX
- C++ / WINDOWS
- IMS DB/DC & DB2
- CICS / CLIENT SERVER
- PROGRESS / ORACLE
- AS/400
- MAC-PAC
- OS/2

PROTECH SYSTEMS GROUP, INC.
5545 Murray Road Suite 300
Memphis, TN 38119
800/450-5100
FAX 901/767/9350

ECOM
Contract positions available immediately
- IDMS/ADSO
- POWERHOUSE
- APS

Please call/fax/mail:
ECOM
10333 N.W. Frwy. #414
Houston, TX 77092
(713) 686-9740
Fax.(713) 686-9454

data processing
SAP
We are an international professional services firm seeking experienced SAP consultants to join our SAP practice as full time employees or independent contractors.
Immediate opportunities and top dollars are available throughout the US for professionals possessing experience with any R2 or R3 SAP module along with knowledge of ABAP & Screenpainter.
If you are a qualified, career oriented professional please write, call or fax your resume to:
Maureen Sherman, National SAP Recruiting Center
COMPUTER TASK GROUP
30 N. Union St.
Rochester, NY 14607
716-325-4220
Fax 716-325-1998
EOE

TANDEM

UNISYS PROGRAMMERS
We specialize in the permanent and contract placement of UNISYS PROGRAMMERS throughout the U.S. If you have U2200 or A-Series experience in LINC, MCP, COBOL, MAPPER, DMS, ALGOL, C, MASM, EXEC, TELCON, COMS or XGEN. Service is free. Call TODAY!
COMPUTER STAFFING

Marketplace

NETWORK INVENTORY MANAGEMENT SOFTWARE

'My vendor didn't tell me that. . .

shopper alert!

By Alice Bredin

Network professionals are not insulated from bad buys. They often learn on the job about troublesome product characteristics that were never mentioned during presale discussions with the vendor.

These problems can be inconvenient, but more important, they can result in poor network performance. In a recent poll, network professionals shared their complaints, frustrations and advice on purchasing network inventory management software.

. . .the software isn't compatible with older PC models.'

■ When network administrator Barbara Vernon Ryan bought network inventory software for her San Francisco-based employer, Specialty Brands, Inc., she did not get what she hoped for. Although she was told the software was designed to run on any Intel Corp.-based 80386 PC, it did not run on some of the company's older networked 386s.

When it did, the PCs froze, making it necessary to modify the network scripting to exclude the older systems from the software. Unfortunately, the vendor had neglected to mention this quirk.

Vernon Ryan now knows that even though software is compatible with a certain system type, that does not mean it will run on every one.

"Now I ask for a database of known problems with the software. I also want to be put in touch with a customer that has an almost identical network so I can uncover the problems myself," Vernon Ryan explains.

. . .the software won't let me choose the frequency of network scans.'

■ One of the features Sandra Duphily, a local-area network administrator at Ocean Spray Cranberries, Inc. in Middleboro, Mass., wanted but did not get was the freedom to designate how often the inventory package scans the system to determine what software is running. Some packages have this capability, but others mandate a search every time the system is turned on. Duphily has learned that vendors do not necessarily mention this difference because it is a significant drawback.

"You may want the machine to execute the process of checking what's on the system only once a week because you don't want the user to spend 10 minutes logging on each time," she says.

. . .the software only accepts user IDs to identify users on the network.'

■ Some packages identify the user by a user identification; others use a network interface card address. A package relying on user IDs will prevent a company from keeping track of its systems because it logs the nser onto all systems on the network.

The problem with this method is that it registers the nser as having all of the network's software on his desktop. Network interface card addresses reflect only what software is contained on the system a person is working on.

"We need an automated process that accurately reflects inventory so we don't have to walk around to every desk and see what each person has," Duphily explains. "This way, when your boss asks, 'What does Mary Jo have on her desk?', you know."

. . .the quality of the report printouts is poor.'

■ Roscoe Floyd, LAN specialist at Humiston Keeling Co., a pharmaceutical distributor in Calumet City, Ill., says his vendor failed to tell him the network inventory package he bought does not generate polished reports.

Although Floyd says that he is pleased with the package's systems monitoring capability, the hard copy reports are unfortunately not suitable for widespread use.

When the vendor was called to task, it acknowledged the weakness.

"I now have to plug the inventory information into WordPerfect to make nice-looking reports. Next time, I will ask to see an example report to check the quality," Floyd says.

. . .the software inventories by file name only.'

■ Wayne Robertson, network administrator at Saint Agnes Medical Center in Fresno, Calif., has also learned a lesson from the school of hard knocks. He purchased a network inventory package and discovered that it did inventories by file name only, rather than by examining the code.

"The problem with this approach is that if I name a file WP, the system may think it's WordPerfect if it doesn't examine a few lines of the file's code," Robertson says. "These packages are operating on guesswork instead of closely examining files."

Robertson says he learned how to ask the right questions when he finally determined he could not assume anything. "Vendors are delivering a functional piece of software, but just because it runs doesn't mean it's going to meet all my needs," Robertson says. "I used to make a lot of assumptions. Now I make a lot of enemies for asking so many questions."

Bredin is a free-lance writer in New York.

Buy. Sell. Lease.

DEMPSEY. WHERE IBM® QUALITY IS SECOND NATURE.

- RS/6000
- SERIES/1
- SYSTEM 36/38
- 9370
- INDUSTRIAL PC
- ES/9000
- AS/400

BUY–LEASE–SELL
- Processors
- Peripherals
- Upgrades

For preleased equipment, flexible financing, configuration planning, technical support and overnight shipping call

(800) 888-2000.

Dempsey BUSINESS SYSTEMS
Where IBM Quality Is Second Nature

16377 Beach Blvd., Suite 323 · Huntington Beach, CA 92648 · (714) 847-8486 · FAX (714) 847-3149

IBM Authorized Dealer/Lessor Integrator

IBM is a registered trademark of International Business Machines Corporation.

...omputerworld, you can ...our next trip to the library ...leaving your desk.

...introduces CW Online; a comprehensive, fully ...ary of Computerworld articles. With CW Online, you ... three most recent years of Computerworld issues. ... is updated weekly, so you can access new ...ry week. Research has never been so easy, so ... economical. Right from your personal computer.

...rt-up kit costs just $25.00 and includes everything ...rt using CW Online including easy-to-use ...s software. After that, you'll be charged just ...up to 2400 bps) or $50.00/hour (9600 bps and ... time along with a $5.00 monthly account service ...en set your account up for us to bill your credit ... your company on a monthly basis.

Call today for your CW Online start-up kit including communications software.

A library of COMPUTERWORLD articles

...ation or to order call 800-643-4668 today.

Buy / Sell / Lease

COMPUTERWORLD

Product Classified Pages

give you buyers with extensive purchase influence.

In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in *Computerworld's Product Classified Pages!*

For more information, call

(800) 343-6474
(in MA, 508/879-0700)

COMPUTERWORLD
PRODUCT CLASSIFIED
Where computer buyers meet computer sellers. Every week.

Executive Infosource!

LARGE INVENTORY INCLUDING:
- 9221/120
- 9221/150
- 9221/130
- Extensive stock of features

Call us for your 9370/9221 needs.

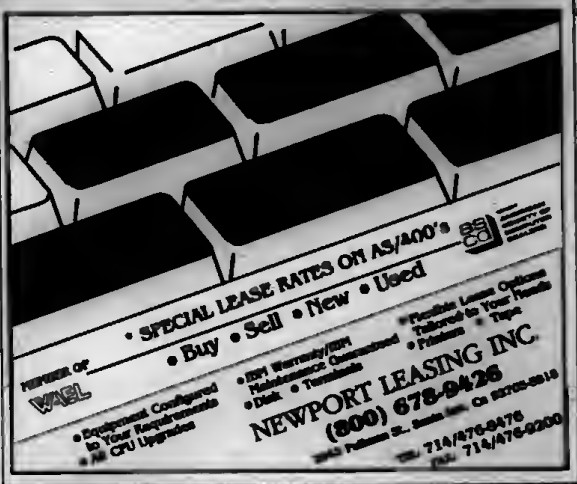
Executive Infosource!
Offering full service technical support

CDLA **708 215-9370**
Fax 708 215 9992

Buy/Sell/Trade
Data General
MV and AVIION Systems and All Peripherals
RAID Disk Systems by HiPerStor
Compatible with: Data General, SUN, HP, Novell & many others.
International Computing Systems
(800) 522-4272
Fax (612) 935-2580

REFURBISHED USED
- UPS SYSTEMS
- STANDBY GEN SETS
- LIEBERT A/C
- ACCESS FLOORING

Computer Site Technologies Inc.
262 S. Military Trail
Deerfield Beach, FL 33442
1-800 226-0784
305-425-0638


• SPECIAL LEASE RATES ON AS/400's
• Buy • Sell • New • Used
NEWPORT LEASING INC.
(800) 678-9426
TEL 714/476-8476
FAX 714/476-9200

629,000 Computer Professionals see the PRODUCT CLASSIFIED pages each week.

Call for advertising information:

(800) 343-6474
(In MA, 508-879-0700)

COMPUTER RESERVES, INC
Remote Computing
OUTSOURCING
NEVER a charge to the Buyer, because our fee is paid by the Seller.
We broker COMPUTER TIME and SERVICES on ALL platforms.
Since 1968 we have found your LOWEST prices from over 2000 nationwide data centers
800 882-0988

COMPUTER MARKETPLACE
BUY, SELL, LEASE & RENT
IBM
Systems, Peripherals, Parts & Services

Specializing in:
- RISC System/6000 (1 month rentals available)
- Workstations
- AS/400
- System/36
- Personal Computers
- Data Communications
- U. P. S. Systems
- Peripherals
- Upgrades
- Parts

COMPUTER MARKETPLACE
800-858-1144 Ext. 97
Computer Marketplace prides itself on being your one call computer hardware solution.

Corporate Headquarters
205 E. 5th St., Corona, CA 91719 • 909-735-2102
Computer Marketplace East 209-742-6846
Communication Division 609-730-1145
CDLA Official UDS/Motorola Distributor

COMPUTERWORLD
Product Classified Pages
need only 2 days notice to run your ad!

When you're selling, you want your advertising to hit the market quickly and frequently. You can't afford to wait for an issue that's coming out several weeks -- or months -- into the future. With *Computerworld*, there's no waiting for the next available issue because we've got one for you every week.

What's more, your ad can appear in the Monday issue of *Computerworld* if you order just 2 days prior to the issue. Advertise in the newspaper that won't keep you waiting. Advertise in *Computerworld's Product Classified Pages!*

For more information, call:
800/343-6474
(in MA, 508/879-0700)

Index of used computer prices

Week ending August 9, 1993

	Closing Prices AmCoEx
IBM PS1 386SX/25	$725
PS/2 Model 70-A21	$825
PS/2 Model 55SX	$625
ThinkPad 300	$1,450
PS/2 Model 90-OH9	$1,600
PS/2 Model 95-OJF	$2,800
Compaq Prolinea 4/66	$2,175
Prolinea 486/50	$1,425
Portable 386	$700
SLT-386	$825
LTE-286	$600
Prosigna 486/66	$3,200
Apple Macintosh SE	$475
IICX	$1,100
IICI	$1,550
IIFX	$2,400
Quadra 700	$2,700

INFORMATION PROVIDED BY BOSTON COMPUTER EXCHANGE, BOSTON, MASS., AND AMERICAN COMPUTER EXCHANGE, ATLANTA, GA.

BUYING
IBM
Toshiba
DEC
C.S.L.
203-222-8609

WE BUY
- HP 9000
- Data General
- RS/6000
- Data Products
- PC's Workstations

...AND WE SELL IT TOO!

(617) 982-9664
FAX (617) 871-4456

New & Used —
- *Computers*
- *Peripherals*
- *Upgrades*

(800) 745-1233
SPECTRA
(714) 970-7000 (714) 970 7095 Fax
Anaheim Corporate Center
5101 E. La Palma Ave., Second Floor
Anaheim, CA 92807

Bids / Proposals / Real Estate

MS CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by CDPA, 301 N. Lamar St., 301 Bldg., Suite 508, Jackson, MS 39201 for the following:

RFP 2471 due Thurs 9/09/93 at 3:30 pm to upgrade or replace the existing MIPS 3230 UNIX-based Innovative Interfaces library management system for Mississippi State University and Mississippi University for Women. $10.00 Charge

RFP 2472 due Wed 9/15/93 at 3:30 pm for the acquisition of hardware, software and technical services needed to fully implement a LAN-based physical plant maintenance system for the University of Mississippi Medical Center. $10.00 Charge

RFP 2473 due Thurs 9/09/93 at 3:30 pm for the acquisition of 70 notebook microcomputers for the Mississippi State Tax Commission. $10.00 Charge

Detailed specifications for each RFP with a charge may be obtained by submitting a written request accompanied by the appropriate payment. No phone requests will be accepted. NOTE: Valid forms of payment are corporate checks on a Mississippi bank, certified check or POSTAL money order made out to Central Data Processing Authority. No cash or out-of-state checks. For RFPs with no charge, call Linda Weeks at 601-359-2604. Pick up RFPs at CDPA between 1:00-3:00 pm only. CDPA reserves the right to reject any/all bids and to waive informalities.

Computer Room Wanted

NJ Growth corporation has a need to acquire, for internal use, a complete data center. Requires: 20+ MIP CPU and peripherals, raised floor, UPS, laser, Etc. All equipment certified for manufacturer's maintenance. This sale may be constructed so that our corporation will provide information services or total outsourcing services for you.

NPA Data Services
711 Union Blvd.,
Totowa, NJ 07012

Over 629,000 computer professionals read Computerworld weekly.

It's the *Product Classified Pages*

Reach Computer Professionals Where They Shop For:

- ☐ Buy/Sell/Lease
- ☐ Conversions
- ☐ Hardware
- ☐ Software
- ☐ Time/Services
- ☐ Training/Education
- ☐ Peripherals/Supplies
- ☐ Solutions Directory
- ☐ Communications
- ☐ Business Opportunities
- ☐ Used Equipment Listings
- ☐ Graphics/Desktop Publishing
- ☐ Bids/Proposals/ Real Estate

(800) 343-6474
(In MA., 508/879-0700)

Jobs / Services

If Outsourcing is your objective...

you can maximize your information technology investment by outsourcing part – or all – of your IS operation. Whether it's a transitional or long-term total services partnership, American Software's the right place to rightsize.

Even software developers enjoy the cost and time-saving benefits of outsourcing with us. Call today and we'll tell you why.

The Outsourcing Group
A Unit of American Software USA
470 E. Paces Ferry Road
Atlanta, GA 30305
404-264-5983

OUTSOURCING
REMOTE **COMPUTING**

MVS
VM
VSE
DB2
IMS/DBDC
CICS
TSO
ICCF

Extensive Software Library

Telenet Tymnet
Searsnet IBM Information Network

Extraordinary Customer Service
Migration Management

FANEUIL (formerly) **GIS** INFORMATION SYSTEMS, INC

Your best choice for mainframe computing services.
815 Commerce Drive, Oak Brook, IL 60521 **708-574-3636**
New England 617-595-8000

ALICOMP, INC.
The "Boutique" of the Computer Services World

VM, MVS, VSE
Outsourcing/Timesharing/Consulting
Remote and On Site

Two *State of the Art* Locations
20,000 sq. ft. Manhattan complex
100,000 sq. ft. Secaucus, NJ complex

"Our Platform is Excellence"

Serving Clients Since 1980

(212) 886-3600 • (800) 274-5556

New/Reconditioned
Computer
Equipment

Whatever your requirements are for Digital Equipment, call CSI first! Buying, selling, trading, leasing, consignments - we do it all!

CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is eligible for DEC maintenance.

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.

Distributors Wanted

CSI Computer Systems, Inc.
99 Bedford St.
Boston, MA 02111
1-800-426-6400
In Mass. (508) 230-5700
FAX (508) 230-5050

629,000 IS/DP Professionals see the

Product Classified Pages

each week. Call for advertising information:

(800) 343-6474
(In MA., 508-879-0700)

COMPUTERWORLD
PRODUCT CLASSIFIED PAGES

Examines the issues while computer professionals examine our message. Call for all the details.

(800) 343-6474
(In MA., 508/879-0700)

Product Showcase

30¢/MB+LIFETIME WARRANTY!

- 3.5" 128MB rewritable optical disk drive is ***FAST*** and operates just like a hard drive
- Meets ISO-ANSI standards
- 1/3 to 1/6 the cost of SyQuest or Bernoulli
- No cheaper way to add disk storage, backup and exchange data or build multimedia libraries
- ***OPTICAL DISK is the ideal solution!***

OPTO ADVANTAGE

128MB Internal Drive	$ 799.
128MB External SCSI	$ 899.
Portable 128MB	$ 999.
Rewritable Optical Disk 5 Pak (640MB)	$ 190.

(Portable Port interface works with Desktop or portable PCs)

*Lifetime warranty applies to rewritable optical disk media only

1-800-873-VALU

Do your users know which button to push?

Custom computer keys printed with color-coded software commands reduce keyboarding errors and eliminate time lost searching for commands in manuals, help screens and pull-down menus!

Improve Data Entry Accuracy • Cut Training Costs

Hooleon Corp.
Dept. COMW, 260 Justin Dr.
Cottonwood, AZ 86325

Free Catalog
800 937-1337
Fax: 602-634-4620

Custom Keyboards . . .
. . . For Custom Applications

- Custom Key Caps, Legends, Colors and Housings
- Custom Cables and Connectors
- Integrated Bar Code and Mag Card Readers
- Iso Point® Pointing Device
- Sun Compatible Keyboards
- Engineering, Development and Production
- Quick Turnaround and Prototypes
- 3 Year Limited Warranty

SOLUTIONS FOR YOUR SYSTEM INTEGRATION NEEDS

KeySource International
Division of United Plastics Corporation
2391 American Avenue
Hayward, CA 94545

PARTNERS IN QUALITY
TEL: 510-783-6000
800-722-8088 FAX: 510-783-2993

Solutions Directory

• Consultants • Value Added Resellers • Marketing Partners • OEMs • Systems Integrators • Distributors

To list your company so that Computerworld's readers can contact you directly, dial 800/343-6474, x744. Basic company listings will appear 26 consecutive weeks for just $499.

4GL

CompuSolve Associates
River Edge, NJ . . . . . (800) 847-6583

ACCOUNTING/PAYROLL

Arthur Ellingsen & Co
Arlington Heights, IL . . . . . (708) 506-0555

ACCTG SOFTWARE/SERVICES

Management Information Consulting, Inc
Falls Church, VA . . . . . (703) 845-5800
Myers-Holum, Inc.
New York, NY . . . . . (212) 753-5353
OPEN SYSTEMS® Accounting Software
Open Systems Holdings Corp. (800) 328-2276
Phase 2 Consulting, Inc
Cumberland, RI . . . . . (401) 333-4536

APPLICATIDNS CONVERSION

Forecros Corporation
San Francisco, CA . . . . . (416) 543-1616

APPLICATIONS DEVELOPMENT

Avalon Engineering, Inc.
Boston, MA . . . . . (617) 247-7668
INTERBASE/PARADOX Consulting
Avalon Solutions, Inc. . . . . (508) 520-1711
CompuSolve Associates
River Edge, NJ . . . . . (800) 847-6583
GREENBRIER & RUSSEL
PowerBuilder VAR . . . . . (800) 453-0347
Mastech Corporation: Nationwide
ORACLE, Sybase, Informix (412) 279-6400
Software Sourcing Company
Atlanta, Georgia . . . . . (404) 898-7900
Planet Data/Paradox Windows Programming
Moriches, New York . . . . . (516) 878-6603

CABLING SERVICES

DATA CONNECTION WORLDWIDE-Design & Install
Throughout the World . . . . (800) 283-2821
Nationwide, 250+ Local Service Locations
Premises One LAN SERV (800) LAN-SERV

CLIENT SERVER DEVELOPERS

ACR Inc. (PowerBuilder VAR)
New York, NY. . . . . (212) 629-3370
INTERBASE/PARADOX Consulting
Avalon Solutions, Inc. . . . . (508) 520-1711
R.M. Boerma, Inc.
Hazleton, PA . . . . . (717) 454-8159
Chen & Assoc., Inc.: PowerBuilder, Visual Basic, etc.
Baton Rouge, LA . . . . . (504) 928-5785
Client Server Systems, Inc.
Wellesley, MA . . . . . (617) 239-8065
Mastech Corporation: Nationwide
PowerBuilder, Gupta, Visual Basic . . (412) 279-6400

Greenbrier & Russel (800) 453-0347
Specializing in client server application development in addition to comprehensive mainframe and midrange consulting services: education programs for AS/400 DB2, client/server and software products

INFORMIX/ORACLE/SYBASE/POWERBUILDER
NexGen SI (PowerBuilder VAR) . (404) 551-8210
PowerCerv (PowerBuilder VAR)
Tampa, FL . . . . . (813) 281-2990
WATERFIELD: PowerBuilder Sales & Consulting
Lexington, MA . . . . . (617) 863-8400
Zeitech, Inc
Stamford, CT . . . . . (203) 359-9807

CDMMUNICATIDNS

Decision Software Systems
Willow Grove, PA . . . . . (800) 682-0794

CONTRACT PROGRAMMING

INFORMIX/ORACLE/SYBASE/UNIX
ACJ & Associates . . . . . (800) 264-6686
MS Windows/C/C++ experts!
Eureka Springs, AR . . . . . (501) 253-8087
Jerry Cohen & Associates
Portland, OR . . . . . (503) 289-7706
ISDN Conson, Inc.
Roslyn Heights, NY . . . . . (516) 265-0341
ORACLE/PARADOX-Offsite Work Preferred
Laurel Hill Software Inc. . . . (800) 554-2676
Mastech Corporation: Nationwide
UNIX, RDBMS, GUI . . . . . (412) 279-6400
PowerCerv (PowerBuilder Specialists)
Tampa, FL . . . . . (813) 281-2990
Software Sourcing Company
Atlanta, Georgia . . . . . (404) 898-7900
TechniSource, Inc
Ft. Lauderdale, FL. . . . . (305) 493-8601

CUSTOMER SERVICE

The Help Desk, Inc
Phoenix, AZ . . . . . (602) 460-1926
PowerCerv (PowerBuilder-based application)
Tampa, FL . . . . . (613) 281-2990

DATA CONVERSION

Data Conversion, Inc.
Minneapolis, MN . . . . . (612) 525-0649

DATA CTR DESIGN/MGMT

21st Century Innovations, Inc.
Aliso Viejo, CA . . . . . (800) 327-4627

DBMS

Advanced Data Management (800) 962-4377
Document DATABASE Tool for the Professionals. We have VAR and Dist. programs available. Call/Write 15 Main St. Kingston, NJ 08528

INTERBASE/PARADOX Consulting
Avalon Solutions, Inc . (508) 520-1711
Business Application Developers, Inc
Anchorage, AK . . . . . (907) 562 -5646
CompuSolve Associates
River Edge, NJ . . . . . (800) 847-6583
On-Line Systems Group
St. Petersburg, FL. . . . . (800) 322-5265

DISASTER RECOVERY

Computer Security Consultants, Inc.
Ridgefield, CT . . . . . (800) 925-2724
Advanced Information Management (703) 643-1002
Woodbridge, VA FAX . . . . . (703) 643-2722
Raymond Professional Management, Inc.
Roswell, GA . . . . . (404) 587-4090
Recovery Management, Inc.
REXSYS® Software . . . . . (800) RMI-8866
Stroht Systems
LDRPS Software . . . . . (800) 634-2016

EDUCATION & TRAINING

GREENBRIER & RUSSEL
AS/400, DB2, Client Server (800) 453-0347

IS Training Services (508) 635-9619
Specializing in providing on-demand educational consulting services and training solutions designed to support the entire IS function -- including the clients of IS. For more information contact: BoyTan & Associates: 5 Old Meadow Ln., Acton, MA 01720. Call now!

Skill Dynamics, An IBM Company
A full service training company that specializes in technical and business training, consulting, outsourcing and customized offerings. Call 1800 IBM-TEACH for a free catalog

MIS Training Institute (508) 879-7999
Framingham, MA . . . . . Fax(508) 872-1153
National Education Training Group, Inc.
Naperville, IL . . . . . (708) 369-3000
Object Oriented Preparation Services, Inc
Robbinsville, NJ . . . . . (609) 259-0601

ELECTRONIC DATA INTERCHANGE

DNS Associates, Inc.
Burlington, MA . . . . . (800) 624-8354
EDI Able, Inc.
Malvern, PA . . . . . (215) 993-0813
Impact Int'l Technologies, Inc.
Princeton, NJ . . . . . (609) 734-7411

ENTERPRISE RESOURCE PLNG

FOURTH SHIFT CORPORATION (JIT)
Minneapolis, MN . . . . . (800) 433-2467

EXECUTIVE INFORMATION SYSTEMS

XENOS Corporation
Dallas, TX . . . . . (214) 869-9860

EXPERT SYSTEMS

FOUNDATION TECHNOLOGIES, INC.
Boston, MA . . . . . (617) 720-2760
OXKO Corporation
Annapolis, MD . . . . . (410) 224-3314

FOCUS

FOCAL SYSTEMS, INC - Focus Consulting
Seattle, WA . . . . . (206) 786-4467

GOV'T/MUNICIPALITIES

Arthur Ellingsen & Co
Arlington Heights, IL . . . . . (708) 506-0555
IDC, Inc.
Chicago, IL . . . . . (312) 464-1020
MMA Consulting Group, Inc.
Boston, MA . . . . . (617) 426-8049

GROUP WARE/E-MAIL

ACR Inc (Lotus Notes VAR)
New York, NY . . . . . (212) 629-3370

GUI FRONT END$

WATERFIELD: PowerBuilder Sales & Consulting
Lexington, MA . . . . . (617) 863-8400

HEALTH CARE

Systems Resources Corp.
Burlington, MA . . . . . (617) 270-9228

HELP DESK

The Help Desk, Inc.
Phoenix, AZ . . . . . (602) 460-1926
PowerCerv (PowerBuilder-based applications)
Tampa, FL . . . . . (813) 281-2990

HUMAN RESOURCE SOFTWARE

SPECTRUM Human Resource Systems Corporation
Denver, CO . . . . . (800) 334-5660

HUMAN RESOURCE SYSTEMS

PC/LAN Personnel, Benefit, and HR Systems
STS, Inc Rolling Meadows, IL . (800) 227-2729

INFO DELIVERY SOFTWARE/SVCS

GenText, inc.
Dallas, TX . . . . . (214) 691-0300

INSURANCE

Programming Resources Company
Hartford, CT . . . . . (203) 728-1428

IMAGING

Avalon Engineering, Inc.
Boston, MA . . . . . (617) 247-7668
Grumman InfoConversion
Holtsville, NY . . . . . (516) 737-7169
Imaging Expo, NY
Sept 28-30 . . . . . 800 44-IMAGE

ISO 9000

ISO 9000 Doc. Mgmt. Systems
OXKO Corporation . . . . . (410) 224-3314

MANUFACTURING SOFTWARE

Effective Management Systems
Milwaukee, WI . . . . . (414) 359-8900
Intrepid Software, Inc.
Burlington, MA . . . . . (617) 273-2920
Man-Trak® - Management Tracking System
Open Systems Holdings Corp.. (800) 328-2276
PowerCerv (PowerBuilder/Sybase application)
Tampa, FL . . . . . (813) 281-2990
Silverline Industries, Inc
Oakbrook, IL (ORACLE VAR) . . (708) 571-5559

MIGRATION SOFTWARE/CONSULTING

GenText, inc.
Dallas, TX . . . . . (214) 692-0300

OFF SHORE SOFTWARE DEV

Mastech Corporation: Nationwide
Excellent Quality - Cost Effective (412) 279-6400
R Systems, Inc., California (916) 631-1503
"Quality Software Developed in India" SAVE $$$!!
Software Sourcing Company
Atlanta, Georgia . . . . . (404) 898-7900

OFF-SITE SOFTWARE DEVELOPMENT

ORACLE/INFORMIX/SYBASE/UNIFACE/Multimedia apps
Silverline Industries, Inc., Oakbrook, IL (708) 571-5555

OUTSOURCING

Advanced Data Management (800) 824-3772
A full service system integrator. Design through implementation, all major databases and tools. Call/Write 15 Main St. Kingston, NJ 08528.

PAYROLL SYSTEMS

SPECTRUM Human Resource Systems Corporation
Denver, CO . . . . . (800) 334-5660
PC/LAN Payroll, HR, and Tax Systems
STS, Inc. Rolling Meadows, IL (800) 227-2729

PRDDUCTIVITY

Productivity Management Group, Inc.
East Amherst, NY . . . . . (716) 689-7724

PROJECT MANAGEMENT

Pitagorsky Consulting/Training
New York, NY . . . . . (212) 696-9697

PURCHASING SOFTWARE

Commerce Software, Inc.
Elmsford, NY . . . . . (914) 592-2102x302
UNIX, C, C++, DOS, WINDOWS, PRO-IV
Avalon Solutions, Inc . . . . . (508) 520-1711

SALES FDRCE AUTOMATION

Gateway Systems Corporation
East Lansing, MI . . . . . (800) 333-9366

SECURITY

National Computer Security Association
Carlisle, PA . . . . . (717) 258-1816
Phase 2 Consulting, Inc.
Cumberland, RI . . . . . (401) 333-4536
RSH Consulting, Inc.
Newton, MA . . . . . (617) 969-9050
System 813, Inc
RACF/Systems . . . . . (914) 425-7758

SOFTWARE FOR SCHOOLS

Matrix Computer Systems, Inc.
Milwaukee, WI . . . . . (414) 541-3028

SPEECH INTEGRATION

Zeitech, Inc.
Stamford, CT . . . . . (203) 359-9807

STORAGE MGMT SOFTWARE SVCS

Adept
Riverside, CA . . . . . (909) 688-7012

SUPPLY CHAIN MANAGEMENT

American Software, Inc.
Atlanta, GA . . . . . (404) 264-5296

WHOLESALE DISTRIBUTION

Arthur Ellingsen & Co.
Arlington Heights, IL . . . (708) 506-0555
ADD+ON® Software Advantage/V
Open Systems Holdings Corp (800) 328-2276

SALES OFFICES

Associate Publisher/Senior Vice President Sales
Kevin McPherson

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700 FAX: 508-879-0446

BOSTON: Vice-President Eastern Advertising Sales/David Pearson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Langley, Lisa Roth, Linda Clinton, COMPUTERWORLD, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 872-2915

CHICAGO: Vice-President Eastern Advertising Sales/David Peterson, COMPUTERWORLD, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (800) 343-6474

NEW YORK: Senior District Manager/Fred LoSapio, District Managers/Paula D'Amico, Rich Morden, Sales Associates/Susan Kerwin, Joan Dellarobba, COMPUTERWORLD, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786

LOS ANGELES: Southwestern Regional Manager/Fran Cowen, Sales Assistant/Jodi Taylor, COMPUTERWORLD, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 261-1230 FAX: (714) 250-4981

SAN FRANCISCO: Vice-President Western Advertising Sales/Richard Experdue, Executive Assistant/Lennea Lahrane, Senior District Managers/Ernie Chamberlain, Raye Shuttrough, District Managers/Michele Gerus, Sharon R. O'Brien, Sales Assistants/Candace Salvato, Emily Gaynor, Ana Medeiros, Denise Sanchez, COMPUTERWORLD, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

ATLANTA: Senior District Manager/Bonna Hockenbrocker, Sales Assistant/Debra Brown, COMPUTERWORLD, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758 FAX: (404) 256-5123

DALLAS: Southwestern District Manager/Darren Ford, Sales Assistant/Brenda Shipman, COMPUTERWORLD, 14851 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882 FAX: (214) 385-1803

WASHINGTON, D.C.: District Manager/Rich Holden, COMPUTERWORLD, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786

CUSTOM PUBLICATIONS:

Vice President/Larry Craven, Director of Publishing Services/Carolyn Novack, Sales Assistant/Heidi Schuberthan FAX: (508) 879-0446

CLASSIFIED ADVERTISING SALES:

Vice President/Classified Advertising/John Corrigan, Marketing Director/Derek E. Mullahy, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

PRODUCT CLASSIFIED ADVERTISING:

Northeast/Great Lakes: Account Manager/Paul Bonanno, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

South: Senior Account Executive/Jay Novack, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

West: Sales Supervisor/F. Jay Sawell, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, Ext. 184, In MA (508) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES:

New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700, Account Executive/Karen Lesko, (800) 343-6474, In MA (508) 879-0700

Mid-Atlantic: Regional Manager/Valerie Gallo, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090, Account Executive/Caryn Glott, (800) 343-6474

South Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (708) 827-4433, Sr. Account Executive/Ellen Cross (800) 343-6474

West: Regional Manager/Barbara Murphy, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164, Sr. Account Executive/Christopher Glenn (800) 343-6474

DIRECT RESPONSE CARDS:

East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

West: Account Executive/Jill Greer, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0168

IDG INTERNATIONAL MARKETING SERVICES:

President/Frank Cottita, Eastern Advertising Manager/Veronique Lamarque, 187 Oaks Road, Framingham, MA 01701 (508) 879-0700

Western Advertising Manager/Gimmy Pohlman, 180 Harbor Drive, Suite 215, Sausalito, CA 94965 (415) 331-7571 FAX: (415) 332-0778

Advantis **24**
American Software **10**
AT&T **25**
BMC Software **70**
Borland **112**
Burl Software **78**
Chipcom Corp **111**
Cincom Systems, Inc **20**
Command Technology **81**
Compaq Computer Corp **9, 46-47, 60-61**
COMPUTERWORLD on CD **76**
Control Data **84**
CW Circulation **80**
CW Classified **54,65,66,76,82,83**
CW Computers for Classrooms **92**
CW Infostructure **68-69**
DCA **48**
Dell Computer **72-73, 75, 77, 79**
Encore Computer Corp **17**
Hayes Microcomputer **52**
Hewlett Peckard **40, 62**
IBM **3,26-27,42-43,82-83**
Indigo Software **74**
ITAA **54**
Lexmark **88**
Lotus Development Cop **67**
MFS Datanet, Inc. **45**
Micro Focus **11**
Motorola Semiconductor **37-39**
Next Computers **58-59**
Novell Inc **50-51**
Oracle Corp **5**
SAP America **29**
SAS Institute **34-35, 44**
Sequent Computer Systems **18-19**
SunSoft **22-23**
Sybase **13**
Synoptics **64-65**
Texas Instruments **30-31, 56-57**
Toshiba America **21**
Tri-Ada **36**
Uniforum **66**
Unisys **55**
Universal Data Systems **7**
XDB Software **15**

The index is provided as an additional service.
The publisher does not assume any liability for errors or omissions.

CW PUBLISHING INC.

An IDG Company: The World's Leader in Information Services on Information Technology

CEO & Publisher
Gary J. Beach

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700 FAX: 508-875-4394

Bill Lohens	Kevin McPherson	Matthew Smith	Steven F. Wolf
Senior Vice-President Editorial	**Associate Publisher Senior Vice President/Sales**	**Senior Vice-President Operations**	**Senior Vice-President Marketing**

PUBLISHER'S OFFICE Executive Assistant to the CEO/Publisher Karen Elliott. **SALES - DISPLAY Advertising Director** Carolyn Novack. **Display Advertising Production Manager** Maureen Hanley. **Display Advertising Coordinators**, Peggy Hennessy, Paula Wright. **SALES - CLASSIFIED Vice President Classified Advertising**, John Corrigan. **Classified Marketing Director** Derek E. Mullahy. **Classified Operations Director**, Cynthia Doherty. **MARKETING Director, Marketing Communications**, Mary Doyle. **Account Manager, Marketing Communications**, Elizabeth Phillips. **Manager, Trade Show & Conventions**, Audrey Shehan. **Marketing Communications Project Coordinator** Susan Thurber. **Administrative Assistant**, Patty Faherty. **CIRCULATION Vice-President Circulation**, Gail Dolloroso. **Director of Circulation Management**, Maureen Burke. **PRODUCTION Production Director** Christopher P. Cuoco. **Production Manager**, Beverly Wolff. **SYSTEMS Vice President Information Systems**, Linda Nelson. **Administrative Sales Assistant**, Lois Bellavia.

GLOBAL LEADERSHIP NETWORK

FOREIGN EDITORIAL/SALES OFFICES

ARGENTINA: Ruben Argento, CW Communications/Sistemas S/A., Av. Belgrano 496-Piso 3°, CP 1092 Buenos Aires, Phone: (011) 541-342 5583, Telex: (390) 22644 (BASA) AR, FAX: (011) 541-331 7872

ASIA: Sun Chan, Asia Computerworld Communications Ltd., 701-4 Sun Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong, Phone: (011) 852 861 8238, FAX: (011) 852 861 0963

AUSTRALIA: Bob Kennedy, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065, Phone: (011) 61 2 4393133, Telex: 17900 AA74752 (CDPWORK) FAX: (011) 63 2 439 3612

AUSTRIA: Manfred Wohl, IDG Communications Gesellschaft m.b.H., Zwerggasse 5, A-1070 Wien, Austria, Phone: (011) 43 222 523 46 249, Telex: (847) 115542 ICSCH/A) FAX: (011) 43 222 523 05 08 33

BRAZIL: Ney Rosa, Computerworld do Brasil Ltda., Praca Floriano 19/20 Andar, 20031 Rio de Janeiro, RJ Brasil, Phone: (011) 55 21 240 8225, Telex: (391) 21 30830 BI São Paulo, Computerworld do Brasil Ltda., Rua Augusta Florence, 486/3 andar CEP 04534, São Paulo, Brasil, Phone: (011) 55 11 852 0534, Telex: (391) 21 30838 (WORD BR) FAX: (011) 55 21 240 7799

COLUMBIA: Cira A. Vilela, Computerworld Colombia, Transversal 23 No. 58-28, Aereo Box 54018, Bogota, Colombia, Phone: (011) 571 310 0188, FAX: (011) 571 212 0848

DENMARK: Preben Engell, IDG Danmark A/S, Lautrupsgade 4 DK-2900 Valby Denmark, Phone: (011) 45 36 442800, Telex: (855) 31566 FAX: (011) 45 36 442033

FRANCE: Francois Chaussonnerie, IDG Communications, Parc Innovation Le Favelin 2, Place des Vosges, Cedex 05, 92051 Paris la Defense, France, Phone: (011) 33 1 4904 PARI, Telex: (842) 0132349, FAX: (011) 33 1 4904 7800

GERMANY: Eckhard Ussenat, IDG Communications Verlag AG, Oberhachstrasse 2A-2B, Postfach 40 04 29, 8000 Munich 40, Germany, Phone: (011) 49 89 360894, Telex: (841) 5215250 (COMW D), FAX: (011) 49 89 3 60 86109.

HUNGARY: Istvan Bara, IDG Communications Hungary Publisher Ltd., 1016 Budapest, Gellerthegy u. 30-32, Postal address H-1536 Budapest, P.O.B. 366, Hungary, Phone: (011) 36 1 156 0122, Telex: (861) 226307 (Hung H), Fax: (011) 361 1 202 9569

INDIA: Ashim Khullar, Media Transasia India Ltd., 103 Anand Lok, New Delhi 110049, India, Phone: (011) 91 11 644 0110, FAX: (011) 91 11 643 2950

ITALY: Brunello Bozzi, IDG Communications Italia, Via Mecenate 90-14, 20138 Milano, Italy, Phone: (011) 39 2 58 01 16 60, Telex: (843) 335318, FAX: (011) 39 2 58 01 16 70

JAPAN: Jon Piper, IDG Communications Japan, KoSoCho TBR Bldg. 6F, Ichi 618, 5-7 Kojimachi, Chiyodaku Tokyo 102, Japan, Phone: (011) 81 33 3222 5811, Telex: (781) 252 4217, FAX: (011) 81 33 3222 6566

MEXICO: Harvey Marquez, Computerworld Mexico S.A. de C.V., Conseter de Cesena #334, Colonia del Valle, 03100 Mexico D.F., Phone: (011) 52 5 669 4454, Telex: (383) 377 1300 (ACHAME), FAX: (011) 52 5 669 1140

THE NETHERLANDS: Brad Bekker, IDG Communications B.V. Schipholweg 1/P.O. Box 5446, 2034 LS/2000 GK Haarlem, The Netherlands, Phone: (011) 31 23 366 814, Telex: (844) 18242 (CWCOM NL), FAX: (011) 31 23 366 184

NEW ZEALAND: Martin Taylor, IDG Communications Ltd., 2nd Floor 15 Augustus Terrace, Parnell, Auckland 1, New Zealand, Phone: (011) 64 9 779 902, Fax: (011) 64 9 774 604

NORWAY: Maarten Hamoen, CW Norge A/S, Hammersv 49, 0676, Oslo 6, Norway, Phone: (011) 472 641725, Telex: (856) 76876 (CW NOR N), FAX: (011) 47 288 8152

PEOPLE'S REPUBLIC OF CHINA: Shen Yan, China Computerworld, 74 La Go Road, Box 750, Beijing 100039, People's Republic of China, Phone: (011) 861 81 0044, Telex: (716) 222214 (CCW CN), FAX: (011) 861 821 7969

RUSSIA: Boris Antipiak, Information Computer Enterprise, Prospekt Mira 187 98 22, UDNH pavilion #4, 129223 Moscow, USSR ICE, Phone: (011) 709 5 187 8830, Telex: (871) 441 354, FAX: (011) 709 5 188 5665.

SINGAPORE: S.W. Chan, Asia Computerworld Communications, 04-07 Parkway Builders Centre, No 1 Marine Parade Central, Singapore 1544, Republic of Singapore, Phone: (011) 65 348 8283, Telex: (786) RS 37003 (Comwor), FAX: (011) 65 345 7097

SPAIN: Paco Zabala, IDG Communications S.A., Ramon Calvo 18, 4B, 28010 Madrid, Spain, Phone: (011) 34 1 310 4014, Telex: (831) 45522 (CW E), FAX: (011) 34 1 310 6104

SWEDEN: Bengt Mamfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41, Stockholm, Sweden, Phone: (011) 46 8667 9180, Telex: (854) 14904 (NOVACW), FAX: (011) 46 8665 3132

SWITZERLAND: Gebhard Osterwalder, CW Publikationen AG, Widenerstrasse no. 13, Postfach 253, CH - 8030 Zurich, Switzerland, Phone: (011) 41 1 55 10 77, Telex: (854) 816740 (CWCI CH), FAX: (011) 41 1 56 1135

TAIWAN: Harry Yen, IDG Communications/Taiwan, 11F-8 No. 137, Section 3, Fu Hsin South Road, Sec. 3, Taipei 10639, Taiwan, R.O.C., Phone: (011) 886 2 721 4302, FAX: (011) 886 2 777 5339.

UNITED KINGDOM: Ian Thalmessinger, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UF, United Kingdom, Phone: (011) 44 71 831 9252, FAX: (011) 44 71 978 0275, Dean Smith, Oliver Smith & Partners, Ltd., 19 Abbeville Mews, 88 Clapham Park Road, London SW4 7BX, United Kingdom, Phone: (011) 44 71 978 1440, FAX: (011) 44 71 975 1550

VENEZUELA: Kalman van Voss Nagy, IDG Communications C.A., Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela, Phone: (011) 58 2 72 74 30, Fax: (011) 58 2 724978

INTERNATIONAL DATA GROUP

Patrick J. McGovern
Board Chairman

Walter Boyd
President

William P. Murphy
Vice President/Finance

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 194 computer publications in 62 countries. Forty million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S Computerworld Argentina, Information Security, AUSTRALIA'S Computerworld, Digital News, PC World, Publish, Reseller, Network World, Mobile Business Australia, Information Management, Macworld, Networks, PC World, PC Works, Pacific Power, Unix World, AUSTRIA'S Computerwelt Oesterreich, PC Test, BELGIUM'S Computerworld, Data News, Data Analyst, Unix World, PC World Belgium, BRAZIL'S Computerworld, Gazeta Mercantil, Micro Mundo, Mundo Unix, PC World, Publish, Supergame, BULGARIA'S Computerworld Bulgaria, Ediworld, PC & Mac World Bulgaria, CANADA'S Direct Access, Graduate Computerworld, InfoCanada, Network World Canada, CHILE'S Computerworld, Informatica, COLOMBIA'S Computerworld Colombia, CZECH REPUBLIC'S Computerworld Czechoslovakia, PC World, DENMARK'S CAD/CAM World, Communications World, Computerworld Danmark, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Windows World, ECUADOR'S PC World, EGYPT'S Computerworld/CW Middle East, PC World Middle East, FINLAND'S Mikro PC, Tietoverkko, Tietoviikko, FRANCE'S Distributique, GOLDEN MAC, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux, GERMANY'S Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unix, HUNGARY'S Alaplap, Computerworld Szt. PC World, INDIA'S Computers & Communications, ISRAEL'S Computerworld Israel, PC World Israel, ITALY'S Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC World Italia, JAPAN'S Computerworld Japan, Macworld Japan, SunWorld Japan, Windows World, KENYA'S East African Computer News, KOREA'S Computerworld Korea, Macworld Korea, PC World Korea, MEXICO'S Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, Macworld, Mundo Unix, PC World, Windows, THE NETHERLAND'S Computer Totaal, LAN Magazine, Macworld, NEW ZEALAND'S Computer Listings, Computerworld New Zealand, New Zealand PC World, NIGERIA'S PC World Africa, NORWAY'S Computerworld Norge, C/Worte, Lotusworld Norge, Macworld Norge, Networks, PC World Ekspress, PC World Norge, PC World's Product Guide, Publish, Student Data, Unix World, Windowsworld, IDG Direct Response, PANAMA'S PC World, PERU'S Computerworld Peru, PC World, PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, PC World China, Electronics International, IDG HIGH TECH BEIJING'S New Product World, IDG SHENZHEN'S Computer News Digest, PHILIPPINE'S Computerworld, PC World, POLAND'S Computerworld Poland, PC World/Komputer, PORTUGAL'S Cerebro/PC World, Correio Informatico/Computerworld Mundo, ROMANIA'S PC World, RUSSIA'S Computerworld Moscow, Mir PC, Sety, SLOVENIA'S Monitor Magazine, SOUTH AFRICA'S Computing S.A., SPAIN'S Amiga World, Computerworld Espana, Communicaciones World, Macworld Espana, NeXTWORLD, PC World Espana, Publish, Sunworld, SWEDEN'S Attack, ComputerSweden, Corporate Computing, Lokala Natverk/LAN, Lotus World, MAC&PC, Macworld, Mikrodatorn, PC World, Publishing & Design (CAP), Datalingvisten, Maxi Data, Windows World, SWITZERLAND'S Computerworld Schweiz, Macwelt Schweiz, PC & Workstation, TAIWAN'S Computerworld Taiwan, Global Computer Express, PC World Taiwan, THAILAND'S Thai Computerworld, TURKEY'S Computerworld Monitor, Macworld Turkiye, PC World Turkiye, UKRAINE'S Computerworld, UNITED KINGDOM'S Lotus Magazine, Macworld, Sunworld, UNITED STATES' AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Desktop Video World, DOS Resource Guide, Electronic News, Federal Computer Week, Federal Integrator, GamePro, IDG Books, Infoworld, Infoworld Direct, Laser Event, Macworld, Multimedia World, Network World, NeXTWORLD, PC Games, PC Letter, PC World Patrol, Sumerge, SunWorld, SWATPro, Video Event, VENEZUELA'S Computerworld, Venezuela MicroComputerworld, Vietnam's PC World Vietnam.

Have A Problem With Your Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:
COMPUTERWORLD, P.O. Box 2043, Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Name
Title
Company
Address
City State Zip

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Please allow six weeks for processing time.

Your New Address Goes Here

Name

Company

Address

City State Zip

Address shown: ❑ Home ❑ Business

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available:

1-800-669-1002
Outside U.S. call (614) 382-3322

COMPUTERWORLD
The Newspaper of IS
P.O. Box 2043, Marion, Ohio 43305

Companies in this issue

Page number refers to page on which story begins

3Com Corp. 12
4th Dimension Software, Inc. 109

A

A. C. Nielsen Co. 53
Aberdeen Group 64
Acknowledge, Inc. 78
Advanced Electronic Applications, Inc. 1
Aldus Corp. 49
ALH Group, Inc 53
Alltel Corp. 7
Alphatronix, Inc. 59
Alternative Technologies 1,10
America Online, Inc. 8
American Airlines 14,15
American Management Systems, Inc. 6
Apple Computer, Inc. 1,4,12,14,41,49, 63,66,89,110
Artisoft, Inc. 16,109
ASK Group, Inc. 53,59,76
AT&T 4,6,63
ATB Associates, Inc. 64
Attachmate Corp. 110
Automotive Industry Action Group 28

B

Bankers Trust Co. 85
Banyan Systems, Inc. 16
Bay State Gas Co. 16
Bear, Stearns & Co. 63
Bell Atlantic Corp. 63
BellSouth Corp. 89
Betz Entec, Inc. 71
Betz Laboratories, Inc. 71
BIS Strategic Decisions 49
Blue Cross/Blue Shield of Massachusetts 89
BlueLine Software, Inc. 78
Blueridge Technologies, Inc. 59
BMC Software, Inc. 78
Bolt Beranek and Newman, Inc. 16
Boole & Babbage, Inc. 76
Borland International, Inc. 8,16,41
Brixton Systems, Inc. 12

C

Cabletron Systems, Inc. 18,110
Calera Recognition Systems, Inc. 49
Canter Technology 89
Carnegie Mellon University 61
CB Commercial 44
CCT, Inc. 1
CE Software Holdings, Inc. 44
CellularVision of New York, Inc. 63
Chalstrom Consulting, Inc. 87
Chelsea Community Hospital 74
Chemical Bank Corp. 8
Chevron Canada Ltd. 1
Chevron Information Systems 15
CIS, Inc. 66
Cisco Systems, Inc. 1,16
Communication Network Architects, Inc. 4
Compaq Computer Corp. 4,44
CompUSA 4
Computer Associates International, Inc. 6
Computer Intelligence/Infocorp 14
Computer Power, Inc. 78
Computer Sciences Corp. 14,16
Congress Federal Corp. of New York 109
Conner Peripherals, Inc. 16
Contel Cellular, Inc. 7
Corning, Inc. 89
Corporate Software, Inc. 41,86,87

D

Database Decisions 93
Dataquest, Inc. 41
Dayna Communications, Inc. 66
Digital Equipment Corp. 6,7,12,14,59, 66,74,76
Digital Ocean, Inc. 4
Diversey Corp. 4
Donaldson, Lufkin & Jenrette Securities Corp. 108
Dry Storage Corp. 8
Du Pont Co. 1

E

Echo Speech Corp. 89
Electronic Equipment Bank 1
EMC Corp. 74
Entex Information Services, Inc. 109
Environmental Systems Research Institute, Inc. 81
Envoy Corp. 108
Eo, Inc. 1
Ernst & Young 85
Euclid Associates 1,93
Ex Machina, Inc. 44

F

Farallon Computing, Inc. 66
Fibermux Corp. 66
First Financial Management Corp. 166
Forrester Research, Inc. 4

G

Gartner Group, Inc. 8,53
Gateway 2000, Inc. 4
Genencor International 1
General Automation, Inc. 59
GTE Corp. 7,89

H

Hewlett-Packard Co. 4,12,16,53,63,71,81,90
Humiston Keeling Co. 102

I

IBM 1,4,6,7,12,16,41,53,59,63, 64,66,71,76,78,89,108
IBM PC Co. 44
Icom Corp. 1
Illinois Power Co. 85,86,87
Imagery Software, Inc. 14
Indiana University 28
Information Resources, Inc. 53
Informix Software, Inc. 53,59,76
International Business Applications, Inc. 41
International Computer Negotiations, Inc. 6
International Data Corp. 4,76
Intersolv Corp. 1,8
Iris Associates 1

J

Johnson & Higgins 41,85
JWP, Inc. 109
JYACC, Inc. 16

K

Kaleida 89
KnowledgeWare, Inc. 6

L

LanOptics Ltd. 109
Lawrence Livermore National Laboratory 12
Lebhar-Friedman 54
LightStream Corp. 16
Lotus Development Corp. 1,14,15,16,41

M

Macro Computer Products, Inc. 16
Magic Software, Inc. 109
MapInfo Corp. 44
Mastercard International, Inc. 1
Meta Group, Inc. 1
Microsoft Corp. 1,4,6,8,12,14,16,41, 49,85,108,110
MIT 85,86
MIT Press 28
Mobius Computer Corp. 16
Montgomery Securities 53
Moore Corp. 20
Mosaic Group 36
Motorola, Inc. 4,44,81
MultiFoods 1

N

National Securities Clearing Corp. 1
NCR Corp. 6,16,53,63,76
Needham & Co. 108
Network Imaging Corp. 59
Network Integration Consultants 94
Newport News Shipbuilding and Drydock Co. 74
Nielsen Marketing Research 44
Norwest Bank Minnesota, N.A. 76
Novell, Inc. 1,10,12,14,16,41,44, 53,59,71,78,110

O

Ocean Spray Cranberries, Inc. 102
Olympia Software 93
Omnidesk, Inc. 71
On-Line Power, Inc. 78
Open Software Foundation 58
Opper & Associates, Inc. 85
Oracle Corp. 1,10,44,59,76

P

Pacific Gas & Electric Co. 15,85,86
Pacific Stock Exchange 36
PacifiCare Health Systems, Inc. 74
Packard Bell Electronics, Inc. 109
Parallan Computer, Inc. 108
Paramount Communications, Inc. 89
Patricia Seybold Office Computing Group 1
PeerLogic, Inc. 110
PeopleSoft, Inc. 71
Peripheral Research Corp. 74
Phoenix Systems 15
Pick Systems 59
Price Waterhouse 14,15
Proteon, Inc. 12
ProTools, Inc. 83

Q

QED Information Sciences, Inc. 93
Qualix Group, Inc. 66

R

Rochester Gas & Electric 63
Rockwell International Corp. 16
Ross Systems, Inc. 78

S

Saint Agnes Medical Center 102
Sanford C. Bernstein & Co. 74
Sapiens International, Inc. 109
Scientific-Atlanta, Inc. 63
Seltex Corp. 59
Sequoia Systems, Inc. 109
SHL Systemhouse Ltd. 53
Smith Barney Shearson, Inc. 20,108
Specialty Brands, Inc. 102
Speedware, Inc. 71
Stac Electronics, Inc. 6,110
Stanford University 20
States Nitewear, Inc. 4
Sterling Software, Inc. 109
Stratus Computer, Inc. 64
SQL Access Group 93
Sun Microsystems Computer Corp. 12
Sun Microsystems, Inc. 4,16,53,59
Sybase, Inc. 53,76
Symantec Corp. 8
Sync Research, Inc. 12
Systematics Telecommunications Service, Inc. 7
Systems Strategies, Inc. 12

T

Tandem Computers, Inc. 110
Tandy Corp. 49
Tantara Technologies 66
Technology Transfer Associates 53
Tele-Communications, Inc. 89
Telxon Corp. 6
Texas Instruments, Inc. 1
The Burton Group 16
The Forefront Group 14
The Millicraft Paper Co. 20
The Torrington Co. 4
The Turner Corp. 4
The Walt Disney Co. 89
Thinking Machines Corp. 28
Time Warner, Inc. 89
Toshiba America Information Systems, Inc. 44
Toyota Motor Corp. 28
Toys R Us, Inc. 89
Trinzic Corp. 87

U

U.S. Department of Defense 6
Ungermann-Bass, Inc. 16,63,110
Unidata, Inc. 59
Uniface Corp. 1
Unisys Corp. 16,20,81
United Grain Growers Ltd. 1
University of Michigan 28

V

Viacom International, Inc. 24
ViewPoint Systems, Inc. 14
VMark Software, Inc. 76
Volpe, Welty & Co. 166

W

Walker Richer & Quinn, Inc. 71
Warner New Media 89
Watcom International, Inc. 6
Watermark Software, Inc. 14
Wetzer Associates, Inc. 85,87
Winchester Systems, Inc. 59
WordPerfect Corp. 41,44
Workgroup Productivity Corp. 85,86

X

Xerox Corp. 54
XL/Datacomp, Inc. 78

Z

Zenith Electronics Corp. 63
Zeos International Ltd. 4

Friday Stock Ticker

Gainers

Percent

Group I Software	10.0	Telebit Corp.	+18.2
Cray Computer	38.6	Policy Management Sys.(L)	+16.7
Artel Communication Corp.	24.4	Burland Int'l. Inc.(L)	+12.9
Easel Corp.	21.7	DSC Communications(H)	+12.0
Mica Software	21.1	Bolt, Beranek & Newman(H)	+11.8
TeleVideo Systems	19.4	Wang Interactive Systems	+11.5
Diamond Discount Software(L)	18.5	McAfee Associates	+11.5
General Datacomm Inds.	18.4	Chips and Technologies	+9.1

Dollar

Hewlett Packard Co.	3.75	DSC Communications(H)	+7.50
TeleVideo Systems	3.50	Policy Management Sys.(L)	+4.63
Group I Software	3.00	SynOptics(H)	+3.00
Computer Computer Corp.	2.88	Wellfleet Communications(H)	+3.00
Intel Corp.	2.75	Cisco Systems Inc.(H)	+2.75
Matsushita Electronics(H)	2.50	Sybase Inc.	+2.63
PeopleSoft	2.00	Sun Microsystems Inc.	+2.63
Powersoft	2.00	Autodesk Inc.	+2.63

Losers

Percent

Cadnetix Corp.	9.0	Telebit Corp.	-18.2
Cray Computer	38.6	Policy Management Sys.(L)	-16.7
Artel Communication Corp.	24.4	Burland Int'l. Inc.(L)	-12.9
Easel Corp.	21.7	DSC Communications(H)	-12.0
Mica Software	21.1	Bolt, Beranek & Newman(H)	-11.8
TeleVideo Systems	19.4	Wang Interactive Systems	-11.5
Diamond Discount Software(L)	18.5	McAfee Associates	-11.5
General Datacomm Inds.	18.4	Chips and Technologies	-9.1

Dollar

Hewlett Packard Co.	3.75	DSC Communications(H)	-7.50
TeleVideo Systems	3.50	Policy Management Sys.(L)	-4.63
Group I Software	3.00	SynOptics(H)	-3.00
Computer Computer Corp.	2.88	Wellfleet Communications(H)	-3.00
Intel Corp.	2.75	Cisco Systems Inc.(H)	-2.75
Matsushita Electronics(H)	2.50	Sybase Inc.	-2.63
PeopleSoft	2.00	Sun Microsystems Inc.	-2.63
Powersoft	2.00	Autodesk Inc.	-2.63

Street favors Parallan . . .

Parallan Computer, Inc. (PLLN) seems to be the investment analyst favorite among superserver vendors right now.

Parallan's local-area network servers are sold through IBM (IBM), providing access to IBM's superior marketing muscle and excellent resources for research and development. IBM recently announced that it will fund development work for Parallan servers running **Microsoft Corp.**'s (MSFT) interminably awaited Windows NT operating system.

As a result, Parallan found its way onto the Focus List at Needham & Co. and the Best Picks list at Volpe, Welty & Co. Both Wall Street firms said they like Parallan's long-term prospects and recommend purchase of Parallan shares.

Volpe, Welty analyst Paul Bloom noted that a narrow revenue shortfall in Parallan's most recent quarter was due solely to the way Parallan elects to recognize revenue from IBM.

Other technology companies that made the Focus List include the following: Cisco Systems, Inc., because of the phenomenal demand for high-end routers; Informix Corp., which Needham & Co. said is still undervalued among relational database management system manufacturers; Sybase, Inc., the leader in earnings per share growth; and PeopleSoft, Inc., which has maintained an early lead in client/server software.

. . . and transaction processors

Credit-card transaction processors First Financial Management Corp. (FFM) and Envoy Corp. (ENVY) have also drawn attention from Wall Street in recent weeks.

Donaldson, Lufkin & Jenrette Securities Corp. initiated coverage of First Financial Management with a rating of Very Attractive. Market leader First Financial Management handled roughly $43 billion in merchant credit-card transactions last year and is ready to jump into the lucrative health care processing field.

Smith Barney Shearson, Inc. analyst Keith Mullins upgraded Envoy's rating to Buy in an Aug. 6 report. Having completed the difficult assimilation of two major accounts (totaling 70 million transactions annually), Envoy should begin to pick up steam.

The company is well-positioned in credit-card processing and electronic prescription claims processing. Trends in both arenas point to strong growth potential for Envoy, Mullins said.

—Derek Slater

Exch	52 Week Range			Aug 13 3PM	Wk Net Change	Wk Pct Change
Communications and Network Services						
OTC	40.00	10.25	3 COM Corp	22.38	-0.13	-0.6
NYS	82.88	63.38	American Info Techs Corp (H)	81.50	-0.75	-0.9
NYS	65.00	40.63	AT&T	62.13	-0.50	-0.8
OTC	6.06	0.75	Artel Communication Corp	3.50	0.69	24.4
OTC	24.50	10.25	Gervan Systems Inc	18.75	-1.00	-5.1
NYS	60.13	44.50	Bell Atlantic Corp.	58.13	0.00	0.0
NYS	58.88	46.75	BellSouth Corp.	56.00	0.00	0.0
NYS	14.50	3.63	Bolt, Beranek & Newman(H)	11.25	-1.50	-11.8
OTC	18.50	9.50	Brooktrout Technology	11.75	-1.00	-7.8
NYS	119.00	53.00	Cabletron Systems(H)	115.75	1.50	1.9
OTC	28.00	5.88	Centigram Communications(H)	27.50	1.00	3.8
OTC	54.25	19.00	Chipcom Corp (H)	50.88	-0.13	-0.2
OTC	59.25	22.13	Cisco Systems Inc (H)	53.75	-2.75	-4.6
OTC	16.38	5.50	Compression Labs Inc	13.63	0.00	0.0
OTC	36.00	13.00	CrossComm	26.75	-1.50	-5.3
OTC	4.63	1.38	Data Switch Corp	3.00	0.13	4.3
NYS	19.88	12.38	Digital Comm Assoc	13.88	-0.50	-3.7
OTC	12.75	3.75	Digital Systems Int'l Inc (L)	4.25	-0.25	-5.6
OTC	60.63	5.88	DSC Communications(H)	54.75	-7.50	-12.0
OTC	9.50	4.75	Fibronics Int'l Inc	5.25	-0.38	-6.7
OTC	24.00	9.25	Frenet Corp	12.50	0.25	2.0
OTC	4.38	1.50	Gabdall Technologies Inc.	2.63	-0.13	-4.5
OTC	7.06	0.81	Gateway Communications(L)	0.88	0.03	3.7
NYS	15.75	2.00	General Datacomm Inds	11.25	1.75	18.4
ASE	3.75	2.00	Go Video	2.44	0.00	0.0
NYS	37.75	32.38	GTE Corp.	36.13	0.88	2.5
NYS	93.00	62.75	ITT Corp (H)	92.13	2.38	2.6
OTC	29.88	16.06	MCI Communications Corp	28.75	-0.25	-0.6
OTC	6.50	1.50	Microcom Inc	1.75	-0.13	-6.7
OTC	24.25	3.50	Netrix Corp	3.88	-0.11	-3.1
OTC	19.00	7.00	Network Computing Devices	7.25	-0.50	-6.5
NYS	15.00	5.38	Network Equipment Tech.	9.25	0.00	0.0
OTC	20.13	8.00	Network General	11.38	-0.25	-2.2
OTC	15.75	6.88	Network Systems Corp	7.75	0.50	6.9
OTC	61.13	7.63	Newbridge Networks Corp.(H)	57.38	2.38	4.0
NYS	46.00	21.38	Northern Telecom Ltd	23.63	-0.75	-3.1
OTC	35.25	17.63	Novell Inc.	21.50	-1.50	-6.5
OTC	92.50	79.00	Ornet Corp	90.50	2.13	2.4
OTC	30.00	14.50	Octel Communications Corp	21.50	-0.50	-2.3
OTC	6.13	3.38	Pipeline Data Comm Networks	3.75	-0.25	-6.3
OTC	30.50	10.25	Picturetel Corp	18.11	0.88	5.1
OTC	15.25	3.63	Proteon Inc	4.00	0.00	0.0
NYS	35.00	16.84	Scientific Atlanta Inc.	33.75	-0.38	-1.1
NYS	61.88	31.75	Southwestern Bell Corp (H)	61.88	1.50	2.7
NYS	36.63	25.25	Sprint Corp	35.25	-0.25	-0.7
OTC	27.00	11.38	Standard Microsystems Corp	19.50	1.38	7.6
OTC	18.50	8.25	Stratacom Inc	12.50	0.00	0.0
OTC	42.75	10.75	Synoptics Communications	29.25	-1.13	-3.7
OTC	7.00	3.75	Telebit Corp	4.50	-1.00	-18.2
OTC	16.75	2.25	Telematics Int'l. Inc.	10.75	0.88	8.9
OTC	28.50	16.00	US Robotics	28.00	0.00	0.0
@YS	47.75	35.25	U S West Inc	45.88	-0.38	-0.8
OTC	56.00	17.50	Wellfleet Communications(H)	50.75	-3.00	-5.6
OTC	18.00	7.25	Xircom	18.00	1.75	10.8
Personal Workstations						
OTC	5.56	2.50	Advanced Logic Research	3.25	0.25	8.3
OTC	65.25	25.25	Apple Computer Inc	27.25	-2.50	-8.3
OTC	24.25	11.25	AST Research Inc.	14.50	-0.11	-0.9
NYS	9.38	2.50	Commodore Int'l.	3.75	0.25	7.1
NYS	61.75	27.75	Compaq Computer Corp.	52.63	2.88	5.8
OTC	89.88	13.50	Dell Computer Corp.	19.61	-0.75	-3.7
@YS	89.25	50.25	Hewlett Packard Co.	75.25	3.75	5.2
NYS	39.75	17.63	Silicon Graphics	33.13	-1.25	-3.6
OTC	41.00	24.00	Sun Microsystems Inc.	26.50	2.63	-9.0
NYS	32.38	27.25	Tandy Corp.	29.00	-0.50	-1.7
OTC	7.00	2.75	Zeos International Ltd.	3.00	-0.25	-7.7
Large Systems						
ASE	15.13	4.63	Amdahl Corp	5.25	0.00	0.0
NYS	8.75	3.75	Convex Computer	3.75	-0.13	-3.2
OTC	6.11	2.25	Cray Computer	3.38	0.75	28.6
NYS	30.88	19.00	Cray Research Inc.	20.63	-0.50	-2.4
NYS	13.88	7.63	Data General Corp	8.25	0.25	3.1
NYS	49.25	30.38	Digital Equipment Corp	36.25	0.75	-0.7
@YS	43.38	28.38	Kappos Corp	43.13	0.88	2.1
NYS	89.11	41.13	IBM	41.50	-1.75	-4.0
OTC	22.00	5.50	Kendall Square Research	19.75	1.25	6.8
@YS	132.00	83.00	Matsushita Electronics(H)	132.00	2.50	1.9
OTC	23.75	6.25	NetFrame	15.00	0.25	1.7
OTC	17.25	9.25	Parallan Computer	15.00	-0.75	-4.8
OTC	21.00	6.00	Pyramid Technology	19.00	0.00	0.0
OTC	24.00	11.25	Sequent Computer Sys.	14.63	0.38	2.6
OTC	8.75	1.38	Sequoia Systems Inc	1.91	-0.09	-6.7
NYS	48.38	20.25	Stratus Computer Inc (L)	23.88	1.75	5.5
NYS	16.88	9.63	Tandem Computers Inc	9.63	-0.38	-3.8
OTC	23.50	10.63	TriCord Systems	21.50	3.50	19.4
@YS	13.88	7.75	Unisys Corp	10.88	0.63	6.1
Software						
OTC	37.00	12.63	Adobe Systems Inc	27.25	0.38	1.4
OTC	20.75	10.25	Aldus Corp	16.50	-1.75	-7.0
OTC	11.25	5.50	American Software Inc	7.50	0.88	13.2
OTC	28.13	9.50	Ask Computer Systems	10.63	0.13	1.2
OTC	58.75	38.63	Autodesk Inc	41.38	2.63	-5.7
OTC	10.50	2.50	Bachman Info. Systems	3.63	0.25	7.4
OTC	43.00	31.00	BGS Systems Inc.	11.50	-0.25	-2.3
OTC	84.13	36.75	BMC Software Inc	57.50	-0.50	-0.9
OTC	28.25	18.00	Boole & Babbage	24.00	0.50	2.1
OTC	49.00	16.00	Borland Int'l. Inc.(L)	18.00	-2.75	-12.3
OTC	5.00	2.25	CE Software(L)	2.88	-0.25	-8.0
ASE	14.88	8.50	Cheyenne Software Inc.	12.13	-0.75	-2.3
OTC	19.50	8.25	CompSoft	10.00	0.50	5.3
OTC	8.88	5.61	Cognos Inc.	8.75	0.00	0.0
NYS	31.38	13.00	Computer Associates	29.50	-0.38	-1.3
@YS	12.38	7.75	Computervision Corp	11.13	0.00	0.0
OTC	34.25	19.25	Compuware Corp	27.75	1.50	5.7
OTC	14.75	5.75	Comshare Inc.	9.00	-0.75	-7.7
OTC	20.38	10.75	Cores Corp (H)	20.38	1.88	10.1
OTC	15.25	5.00	Easel Corp.	7.00	1.25	21.7
OTC	25.25	12.00	4th Dimension	19.25	0.75	4.1
OTC	19.50	5.25	Frame Technology	8.19	0.63	8.1
OTC	17.50	8.38	Group I Software	13.00	3.00	30.0
OTC	35.25	14.50	Gupta	18.00	-0.13	-0.7
OTC	10.25	4.11	Hogan Systems Inc.	9.75	0.50	5.4
OTC	25.75	11.25	IMRS	21.25	0.75	3.7
OTC	38.00	21.00	Information Resources	35.75	0.50	1.4
OTC	27.25	9.06	Informix Corp.	20.00	-1.88	-8.6
OTC	16.75	8.50	Intergraph Corp (L)	9.25	0.25	2.8

Exch	52 Week Range			Aug 13 3PM	Wk Net Change	Wk Pct Change
OTC	13.63	6.00	Interleaf Inc.	6.88	0.13	-1.8
OTC	18.00	4.75	Intersolv Inc	6.00	0.63	11.6
OTC	36.00	7.75	Knowledgeware Inc	11.61	0.38	3.3
OTC	56.75	15.50	Legent Corp	20.38	-0.50	-2.4
O1C	40.13	14.75	Lotus Development(H)	36.00	-0.63	-1.7
OTC	23.00	5.75	MathSoft	6.50	-0.25	-3.7
OTC	23.25	4.50	McAfee Associates	5.75	-0.75	-11.5
OTC	13.63	2.00	Mica Software	5.75	1.00	21.1
OTC	12.00	5.25	Mentor Graphics	9.00	-0.25	-2.7
OTC	46.00	26.63	Micro Focus	27.00	-0.25	-0.9
OTC	13.25	4.38	Microsmarts Inc.	6.50	0.38	6.1
OTC	98.00	68.00	Microsoft Corp	79.75	0.00	0.0
OTC	53.75	15.75	Oracle Corp (H)	51.38	-1.63	-3.1
OTC	38.50	18.38	Parametric Technology(H)	37.00	-0.13	-0.3
OTC	40.50	22.50	PeopleSoft	33.75	2.50	8.0
OTC	7.13	3.50	Phoenix Technologies	4.38	-0.13	2.8
OTC	40.00	27.00	Powersoft	31.25	2.50	8.7
OTC	41.50	17.00	Platinum Software	37.50	0.61	1.7
OTC	25.00	10.25	Platinum Technology	13.88	1.38	11.0
OTC	61.50	32.25	Progress Software Corp.	52.50	1.75	3.4
OTC	7.38	2.50	Quarterdeck Office Sys.	2.94	-0.06	2.1
OTC	32.00	15.00	Rainbow Technologies Inc	27.00	2.00	8.0
OTC	10.75	4.00	Rasterops	8.50	0.00	0.0
OTC	15.25	3.63	Ross Systems	8.88	0.50	6.0
O1C	27.75	6.63	Sapiens Intl. Corp N.V.	23.75	-1.38	-5.5
OTC	14.50	5.50	Software Publishing Corp.	6.00	0.25	4.3
OTC	13.63	2.50	Software Toolworks Inc	13.63	1.13	9.0
OTC	2.75	0.75	Spinnaker Software	1.31	-0.06	-4.5
OTC	13.00	3.25	State of the Art	11.75	-0.25	2.3
NYS	26.63	19.00	Sterling Software Inc.	23.75	1.00	4.5
OTC	21.63	8.00	Struct Dynamics Research(H)	20.13	0.50	-2.4
OTC	77.50	26.50	Sybase Inc	70.88	-2.63	-3.6
OTC	18.63	5.88	Symantec Corp	16.25	1.13	7.4
NYS	12.50	5.25	Systems Center Inc.	10.25	0.00	0.0
OTC	25.50	10.00	System Software Assoc.	23.00	1.00	4.5
OTC	6.38	2.75	Trimzic Corp	3.38	0.13	3.8
OTC	23.25	10.00	Vigilogic Systems(H)	21.88	-0.13	-0.6
OTC	23.50	5.50	Walker Interactive Systems	5.75	-0.75	-11.5
OTC	3.19	1.31	Wordstar	1.31	-0.03	-2.3
Semiconductors						
NYS	32.88	8.38	Advanced Micro Devices	29.88	2.00	7.2
NYS	24.25	6.38	Analog Devices Inc.	24.25	1.13	4.9
OTC	35.00	7.63	Atmel Corp (H)	31.63	-1.75	-5.2
OTC	5.50	2.75	Chips and Technologies	3.75	0.38	9.1
O1C	39.75	13.00	Cirrus Logic	27.25	1.63	6.3
NYS	16.38	7.88	Cypress Semiconductor Corp.(H)	15.38	-0.13	-0.8
NYS	17.88	9.38	Dallas Semiconductor(H)	17.88	0.25	1.4
OTC	60.63	27.11	Intel Corp	59.75	2.75	4.8
NYS	19.25	6.88	LSI Logic Corp (H)	17.25	1.13	-6.1
OTC	23.50	13.66	Lattice Semiconductor(H)	21.88	-0.88	-3.8
NYS	50.00	14.38	Micron Technology(H)	49.50	0.11	0.3
NYS	98.50	41.38	Motorola Inc.(H)	95.88	-1.50	-1.5
NYS	18.88	9.88	National Semiconductor(H)	18.38	0.63	3.5
OTC	19.75	6.50	Sierra Semiconductor	8.00	0.88	12.3
OTC	51.75	23.00	SynOpsys(H)	48.00	3.00	-5.9
@YS	78.13	36.75	Texas Instruments(H)	75.88	0.25	1.0
OTC	14.25	6.50	VLSI Technology(H)	14.25	1.38	10.7
OTC	12.63	2.63	Weitek	12.63	1.25	16.1
ASE	9.63	1.63	Western Digital Corp.	5.25	0.38	7.2
OTC	44.00	14.50	Xilinx(H)	42.00	0.50	1.2
OTC	33.00	15.34	Zilog Inc.	30.75	1.75	6.1
Peripherals and Equipment						
OTC	45.25	15.00	American Power Conversion	45.25	0.25	0.6
OTC	20.16	15.50	Barctec Inc.	18.63	0.13	0.7
OTC	18.00	6.00	Cambex Corp.	6.00	-0.25	-5.9
ASE	5.88	472.00	Cognitronics Corp.(L)	5.88	6.00	0.0
NYS	25.50	9.00	Conner Peripherals	11.13	-0.63	-5.3
O1C	38.50	11.00	Creative Technologies Inc	21.00	0.13	0.6
OTC	30.75	11.00	Data Race Inc.	14.00	-0.50	-3.6
ASE	13.25	4.75	Datamax Corp.	8.75	-0.38	-4.1
NYS	31.88	5.06	EMC Corp (H)	30.00	0.38	1.3
OTC	10.50	5.38	Emulex Corp	6.75	0.63	10.2
OTC	19.00	13.25	Evans & Sutherland	16.50	0.25	1.5
OTC	17.25	2.50	Exabyte	9.13	0.38	4.3
OTC	28.75	7.00	Intelligent Instl. Systems	26.75	1.75	7.6
OTC	8.88	3.63	Iomega Corp	3.63	0.00	0.0
OTC	15.25	5.75	IPL Systems Inc.	8.50	-0.38	-4.2
OTC	24.00	14.00	Komag Inc.	20.50	0.50	2.5
OTC	19.63	4.38	Maxtor Corp (L)	4.88	0.25	5.4
OTC	10.75	5.75	Micropolis Corp	7.13	1.00	16.3
NYS	117.00	67.00	3M Corp	100.25	1.38	1.1
O1C	7.75	4.00	Printronix Inc.	6.88	0.63	10.0
NYS	17.25	6.88	Qms Inc	9.25	-0.38	-3.9
OTC	17.88	9.50	Quantum Corp.	11.61	0.75	6.9
OTC	9.75	3.13	Radius Inc.	3.88	0.00	0.0
NYS	14.50	8.00	Recognition Equipment	12.88	-0.38	-2.8
OTC	13.88	3.75	Qeton Inc.	4.25	0.38	9.7
OTC	22.38	12.00	Seagate Technology	19.13	-0.88	-4.4
NYS	45.00	18.00	Storage Technology	24.88	-1.75	-6.6
NYS	27.88	17.63	Tektronix Inc.	26.13	-0.25	-0.9
NYS	88.00	70.25	Xerox Corp	74.00	1.00	1.4
Services						
OTC	23.75	14.88	American Mgmt. Systems	17.75	1.50	9.2
@YS	6.75	2.38	Analogic Inc	2.88	0.00	0.0
OTC	35.75	16.25	Analysts Int'l	31.00	0.25	0.8
NYS	58.13	43.00	Auto Data Processing	50.88	0.75	1.5
NYS	17.25	12.50	Ceridian Corp	15.00	-0.25	-1.6
NYS	17.38	11.13	Comdisco Inc.	14.63	0.13	0.9
OTC	9.00	4.50	Computer Horizons	9.00	0.38	4.3
NYS	88.11	63.50	Computer Sciences(H)	88.11	2.00	2.3
NYS	9.25	6.00	Computed Task Group	6.13	0.00	0.0
NYS	40.50	19.00	CorpUSA Inc.	24.38	0.13	0.5
OTC	14.25	6.88	Corporate Software	11.00	1.00	10.0
OTC	12.75	6.63	Egghead Discount Software(L)	8.00	-1.25	18.5
@YS	35.88	26.00	General Motors E (EDS)	30.25	1.88	6.6
OTC	25.50	10.50	Inacom Corp.	20.75	-1.00	-4.6
OTC	16.63	8.13	Intelligent Electronics	16.63	1.50	9.9
OTC	13.13	6.88	Meridge	12.38	1.63	15.1
OTC	24.50	5.75	Microage Inc.(H)	22.00	-0.75	3.5
OTC	43.75	24.50	Paychex	41.25	-0.50	1.1
NYS	87.25	21.00	Policy Management Sys (L)	23.00	-4.63	-16.7
NYS	42.88	20.38	Reynolds and Reynolds(H)	42.88	2.25	5.5
OTC	17.25	11.00	SEI Corp	16.50	-0.25	-1.5
OTC	24.38	17.50	Shared Medical Systems	20.88	-0.88	-4.0
OTC	12.63	5.75	SHL Systemhouse	10.75	0.50	6.6
O1C	30.75	20.00	Software Spectrum Inc.	25.00	0.75	3.1
OTC	19.25	23.25	Sungard Data Systems(H)	39.00	0.00	0.0
NYS	6.38	3.13	Ultimate Corp.	3.25	-0.13	-3.7

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

Copyright Nordby International, Inc. Louisville, CO
This information is based on sources believed to be reliable, and while extensive efforts are made to assure its accuracy, no guarantee can be made. Nordby International and Computerworld assume no liability for any inaccuracies. For phone numbers, addresses, or any additional financial information on any of the above companies call Nordby International at (303) 666-5903.

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN 0010-4841) is published weekly, except 6 issues in August and a single combined issue for the last week in December and the first week in January by CW Publishing Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1993 by CW Publishing Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased through the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by CW Publishing Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $6.00 a copy; U.S. — $165 a year; Canada — $200 a year; Central & So. America — $150 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305

Briefs

PC integrator returns

Entex Information Services, Inc. rose last week from the ashes of JWP, Inc.'s $1.2 billion information services division [CW, May 24]. The Rye Brook, N.Y., company, which is focused on integrating PC networks at large corporations and government agencies, is led by Dort A. Cameron, principal investor and chairman, and John A. McKenna, former senior executive vice president of JWP Information Services.

PC maker gets cash

Packard Bell Electronics, Inc. has completed arrangements for a $70 million recapitalization with **Congress Federal Corp. of New York.** The money will be used by the Chatsworth, Calif., PC maker to refinance its existing debt and provide additional working capital. The refinancing comes weeks after Groupe Bull purchased a 19% stake in Packard Bell [CW, July 26].

Artisoft profits down

Artisoft, Inc. posted fourth-quarter profits of $2.2 million, off 50% from the same period last year. Sales in the period were off 9%, to $19.6 million, the Tucson, Ariz., networking vendor said. For the year, Artisoft earned $9.4 million on revenue of $84.6 million. Those figures were down 29% and up 16%, respectively, from fiscal 1992.

SHORT TAKES **Sapiens International Corp.** posted second-quarter net earnings of $1.1 million, up 7% from the same period last year. Revenue increased 62% in the period to $12 million, the Cary, N.C., application tools vendor said. . . . **Sequoia Systems, Inc.** in Marlboro, Mass., said it has reached a global settlement with all claimants that supersedes previous agreements resolving all suits arising from restatements of the company's financial results. A court hearing on the settlement is scheduled for Sept. 10.

Land of software opportunities

Israeli technologists find money market niches in the U.S. after Gulf war

By Jean S. Bozman
LOS ANGELES

They came from Tel Aviv, Galilee and Jerusalem. They moved to the U.S. to generate sales and working capital. "They" are a growing contingent of Israeli software firms that have found growth and promise in the U.S. computer market.

In many cases, the Israeli firms first expanded operations to Europe in the late 1980s, translating their software products into many languages, including English.

But a further expansion into the U.S., including the establishment of U.S. headquarters, was made in recognition of the growth in client/server, database and open systems software in recent years. Gaining access to U.S. capital was another major attraction for many of these firms. Israel's software industry association lists about 150 software houses, which had combined sales of approximately $550 million in 1991.

Among the Israeli software firms operating in the U.S. are Magic Software, Inc. and 4th Dimension Software, Inc., both in Irvine, Calif, and Sapiens International Corp. in Cary, N.C. Sapiens and 4th Dimension, a purveyor of systems management software, went public last year. Magic went public in 1991. LanOptics Ltd., a $7 million networking software firm near Haifa, Israel, that went public last year, has plans to open U.S. offices but has not yet done so.

Successful moves

Growth has accelerated for many that came to the U.S. in recent years. Magic Software, which makes database application development tools, projects that 1993 sales will grow 60% over 1992's $10 million in revenue. Sapiens, which makes rapid-prototyping tools, has seen revenue jump from $19 million in 1991 to $39 million last year, for example.

Magic Chief Executive Officer David Assia, who was president of the Israeli Association of Software Houses, said many Israeli executives feel that company growth within the borders of their small country, which is approximately the size of New Jersey, is limited. But money began chasing some promising Israeli firms after they collaborated with U.S. companies during the Persian Gulf war.

"There was no venture capital in Israel until after the Gulf war because people didn't believe that software was a technology Israeli people could market successfully outside the country," Assia said. "After the Gulf war, all of a sudden, Wall Street started looking at some potential peace agreements, and venture capitalists started coming here."

The Israeli government also began some incentive programs to boost the country's software industry, Assia said. Israel provides substantial tax incentives for exporters, reducing some Israeli software firms' taxes to less than 10% of revenue, although the standard corporate tax is several times that, some Israeli executives said. The Israeli government is encouraging an influx of dollars and other hard currencies for international trade.

Magic CEO David Assia: *'After the Gulf war . . . venture capitalists started coming'*

Promised land

Israeli firms are expanding their horizons in the U.S. Some examples:

COMPANY	1992 SALES	YEAR WENT PUBLIC IN U.S.	FOCUS
Magic Software	$10 million	1991	Rapid application development tools
Sapiens	$39 million	1992	Rapid application development tools
4th Dimension	$30 million	1992	Systems management software
LanOptics	$7 million	1992	Networking/ hub software

Russia Building

In many cases, the CEOs of Magic [illegible] military service with the Israeli Defense Force, which uses computer technology to guide aircraft and defend Israel's [illegible]. "You will find that many of the people in Israel's high-tech industry [illegible] in the Israeli Defense Force," said Dalia Prashker, president of 4th Dimension. "That's [illegible] we get our basic — and superb — training."

Making the transition to the U.S. was not easy. Two months after 4th Dimension took over operations for its U.S. distributor in Orange County, Calif., it had to stage a user group meeting in San Diego.

"We had to rent office space, set up the computers and buy office furniture all at once," President Dalia Prashker said.

Technical support was handled by several Israeli programmers who flew in for the switch-over to U.S. operations. Follow-up trips to the firm's home base in Israel, which took 25 hours to complete, were frequent at first.

Troubles of another sort date back to 4th Dimension's founding in Israel in the late 1980s. Roni A. Einav, one of the principal stockholders, faces a personal claim from a former business partner. The Israeli investor said he wants to annul the formal dissolution of his financial agreements with Einav now that 4th Dimension is a success, the company said last week. A 1992 prospectus for the firm states: "A former stockholder of ECS [Einav Computer Systems Ltd.] has recently written a letter to Mr. Einav asserting that he is entitled to a 50% beneficial indirect interest in the equity of ECS. Mr. Einav has advised the company that he believes the assertion is without merit."

Israeli firms suffered during the 1980s, when inflation was running high and firms outside the country were fearful of military attack, Israeli executives said. Back then, the Israeli government fostered cooperation among Israeli and U.S. firms, providing tax incentives for joint ventures. More recently, Israel's economy has stabilized with low rates of inflation. Listings on Tel Aviv's stock exchange boomed by 30% last year.

Government incentives

Substantial tax reductions and rebates on capital expenditures still motivate Israeli firms to market in the U.S., said Koby ben-Zvi, president of Sterling Software, Inc.'s storage management division in Rancho Cordova, Calif. In 1991, Sterling acquired the Tefen Lab in Galilee, a storage software firm ben-Zvi helped found in the mid-1980s.

But it is Israel's small size that is forcing many Israeli firms to seek capital in the U.S. "The [Israeli] market is still very small, with just 4.5 million people," ben-Zvi said. "So the [Israeli] companies go public in New York to try to get investors' attention."

The future for these firms is to market globally, Prashker said. "Right now, the U.S. is the leader in software and hardware," she said. "But in 10 years, the worldwide market is going to be bigger than the U.S. market."

Israeli firms have not limited their plans to U.S. shores. Some are already charting plans for Pacific Rim and South American markets as established businesses re-engineer their computer systems and small ones buy computers for the first time. "Countries like Brazil, Argentina and Mexico are awakening to some prosperity," Prashker said. "But right now, the American market is the most important market in the world."

Wysiwyg

Feeee-lings, nothing more than feeee-lings

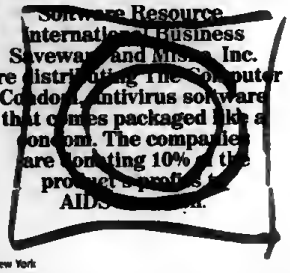
Tandem recently unveiled an on-line application to help karaoke bars solve space problems with storing laser discs, according to *Computerworld Hong Kong*. Tandem customer Andrew Wong, manager of the Corner II Club in Hong Kong, says it helps him stock many more songs — from Cantonese opera and pop songs to English oldies to the latest hit from Taiwan. *New York, New York*, anyone?

GREAT NAMES

Peter Coad
Co-author of the book
Object-Oriented Programming
(Prentice Hall, 1993)

IT HAD TO HAPPEN

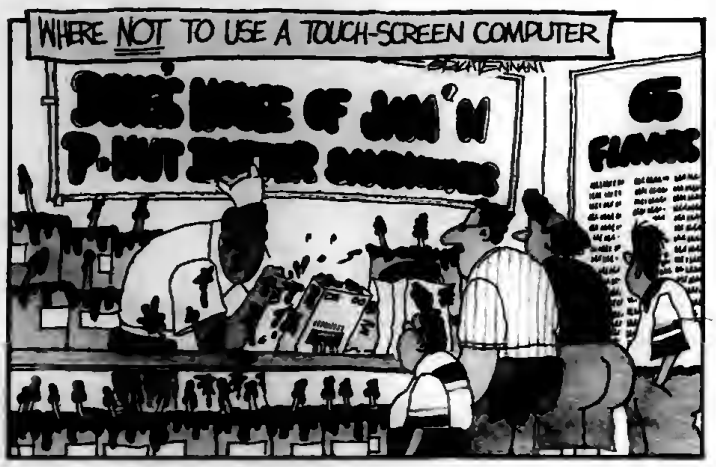
Software Resource International Business Safeway and Mission Inc. are distributing The Computer Condom antivirus software that comes packaged like a condom. The companies are donating 10% of the product's profits to AIDS [illegible].



Sources: *BusinessWeek*; Scientists' Institute for Public Information, New York

WHAT'S THE WORST LIE YOU'VE EVER TOLD YOUR BOSS OR USERS ABOUT THE SYSTEM? WE'D LIKE TO KNOW. PHONE LORY DIX AT (800) 343-6474 EXT. 236, MCI MAIL 594-8011 OR COMPUSERVE THEM TO 594-8011 OR 76537,2413.

The 5th Wave *by* Rich Tennant



Inside Lines

Opening the pipeline

IBM is expected this week to put more meat on the bones of Multi-Protocol Transport Network (MPTN), its architecture for allowing applications written for one network protocol to run over a backbone based on another. IBM will add NetBIOS to the MPTN artillery, allowing NetBIOS applications to run over either TCP/IP or SNA. Also to be announced is an alliance with PeerLogic that will allow applications written to PeerLogic's Pipes middleware product to run over MPTN links.

Pumped-up notebook

Look for Apple to beef up its PowerBook line tomorrow with the introduction of the PowerBook 165, a 33-MHz Motorola 68030-based portable that offers a monochrome, backlit, supertwist, passive-matrix display. With the dual-display mode of the 165, users can display one image on the 165 and a different image or another application on an external monitor concurrently, sources familiar with the machine said. Retail prices will start at $1,899 for a model with 4M bytes of RAM and an 80M-byte hard disk.

Pass along

Novell is apparently offloading some fairly strategic product development to Attachmate. The E-mail and SNA gateway vendor already has Novell's NetWare for SAA client software; this week Novell is expected to announce that it is selling to Attachmate Network Navigator, a software distribution system developed by Novell subsidiary Axxiom. A Novell exec recently said Navigator is a key element of Novell's centralized network management strategy and will shortly become a NetWare Loadable Module.

Foiled again

Novell and Microsoft are expected this week or next to set yet another shipment date for their jointly developed Windows NT requestor, which will allow Microsoft NT clients to access Novell servers. A Novell spokesman attributed the repeated delays to the fact that NT has "only recently stabilized."

Touché

Microsoft will enhance DOS 6.0, bringing out Version 6.2 (to trump IBM's PC-DOS 6.1) in October, according to sources. Microsoft will tweak the product, particularly its DoubleSpace compression utility, and will also let users deinstall DoubleSpace, the sources said. While DOS 6.0's DoubleSpace has drawn attention because of a well-publicized suit with Stac Electronics and questions regarding the stability of the technology, sources close to Microsoft say that it was not the driving force behind the revision. Microsoft intends to add utilities such as write caching, which would make data management more efficient.

James Treybig is true mad. The CEO of Tandem, parent company of Unguermann-Bass, last week refuted long-standing industry scuttlebutt that his company is interested in selling its networking subsidiary. In a letter to customers, prospects and business partners, Treybig bluntly stated: "The plain and simple truth is Ungermann-Bass is not for sale." In an interview, Treybig reiterated that while Tandem would entertain equity investments in UB, the networking vendor remains critical to his company's enterprise client/server strategy. Treybig also questioned the accuracy of a statement made by Cabletron Chairman Craig Benson that he was approached by investment bankers interested in putting together a deal for UB (CW, Aug 2). Treybig said neither he nor his board authorized any investment banker to solicit offers for UB. Treybig pointed out that unauthorized investment bankers often put out feelers. Benson said the investment bankers, whom he declined to name, appeared to be more than just fishing around. He did, however, acknowledge that the solicitation did not come from Dillon Read or Donaldson Lufkin & Jenrette, UB's author/codistribution banker. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's 24-hour voice-mail hotline at (508) 820-8545.

In fact, we've pioneered it from the beginning.

For most of the time they've been in business, other network hub makers have built simple connectivity devices for departmental LANs.

But Chipcom got its start in the brutal environment of the factory floor. Big factory floors. From our very beginning, we created the equipment needed to reliably hold together large, mission-critical networks for big companies.

We realized very early in the game that building a vast network was one thing: Controlling it was another. And we also recognized that as entire enterprises became networked, the problem would become even more critical.

Which is why we were the first to turn to switching, and why we have been the leaders in switching technology ever since. Whether a particular application requires modular, bank,

port or segment-switching, Chipcom has the solution. And as ATM looms ever closer, Chipcom's cell-switching abilities will be ready for it.

Chipcom switching technology makes true enterprise networking a reality.

No other maker of intelligent hubs offers you the vast array of switching capabilities that Chipcom delivers.

No other line of hubs gives you the ability to engineer an enterprise-wide network with the rock-solid reliability, ease of management and control, and flexibility to handle continued change and growth as Chipcom does. And because our roots were planted in the world of big, far-flung networking, our underlying architecture has always assumed bigness. So you never have to scrap your earlier Chipcom investment as you grow.

When you're thinking big, you should be thinking Chipcom.

When a well-known retailer with over 2,000 stores decided to network their entire operation, they chose Chipcom. A large petrochemical company with refineries in six western states made the same choice. A major insurance company with thousands of offices across the U.S. investigated every hub makers' products before they selected Chipcom.

Hundreds of manufacturing companies, financial institutions, universities and government agencies have learned that if you're building a small network, you have a number of choices. But if you're thinking big, there's only one: Chipcom.

To learn what Chipcom switching technology can do for your organization, call **1-800-228-9930** and ask for your free copy of *Network Switching Solutions*. After all, if you're smart enough to realize what switching can do for your organization, you're smart enough to want to talk to the people who pioneered it.

Network Switching Solutions

CHIPCOM

See us at Interop Booth #1926

GS00K93AGS6439

Chipcom is a registered trademark of Chipcom Corporation

© 1993 Chipcom Corporation, Southborough Office Park, 118 Turnpike Road, Southborough, MA 01772

Object Technology isn't a vision of the future. It's here today.

Making software more powerful and easier to use is what Object Technology is all about. Thanks to Borland's early leadership in object-oriented programming, software users and developers are getting more out of their software tools than ever before. The Object Technology built into applications like the Paradox® relational database and Quattro® Pro spreadsheet make it easier for people to learn and use powerful software. And the power of objects enables companies to extend these tools into scalable client/server solutions. ■ Object Technology lets programmers bring new applications on-line in record time. By allowing programmers to create reusable and extensible code components, products like Borland® C++ and Borland® Pascal reduce the development cycle *and* the time required to train users. ● Discover the benefits of working with the innovation leader. Take a closer look at Borland's Object Technology today. **Call now. 1-800-321-3217, ext. 7211.**

Borland
Power made easy

Copyright © 1993 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. BI 5866